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INDUSTRIAL-ARTS MAGAZINE

Volume XIII JULY, 1924 No. 7

Rooms and Equipment for Industrial Arts

Samuel A. Challman, State Inspector of School Buildings, St. Paul, Minn.

TRAINING in the industrial arts has become an integral part of our public school curriculum. The establishment of the junior high school as a part of our school organization is very largely due to an insistent demand for the recognition of skill in useful occupations on the same basis as the traditional subjects, a recognition which it was somewhat difficult to secure under the old form of educational organization.

Beginning with what we ordinarly term the seventh grade, the child has reached a stage, where his physical vision and his muscular control have developed to such an extent that the training of both eye and hand can be undertaken with some degree of assurance of success, in case he has any aptitude whatever for industrial pursuits. If public school education is to give him an all around opportunity for the best kind of training, he ought to have a chance to demonstrate either that he possesses or that he lacks the requisite ability to perform some of the more common industrial tasks. If he demonstrates ability and chooses to continue along the line of some useful occupation, the way to the vocational school or the apprenticeship is open to him at the proper age. It is not intended that the public school in its elementary and secondary courses should do more than merely acquaint him with the main processes of the more common occupations in industrial life. But to do this, it is essential that reasonable physical requirements be met both as to suitable rooms and proper equipment.

There is the danger that, in our enthusiasm for industrial arts, we may be too generous with floor space and too lavish with equipment. It is, therefore, quite essential that the limitations within which the public schools, outside of vocational training which the larger school systems are justified in providing, can offer industrial courses to be properly appreciated. The supply of qualified teachers, the length of the instruction period, the size of classes, the age of pupils, the methods of instruction, and the general atmosphere of the school are all factors to be considered. Without in any way casting any reflection upon many able teachers who are employed in this work, the fact remains that, while some are master workmen, the majority are not. The periods for work in industrial arts are short, though they may be as long as the pupils' time and physical strength permit. The size of classes cannot always be restricted to the number that can best be served by one instructor, but must be governed largely by such considerations as are determined by the general plan of the school organization. If the class units are large in the other departments of the school, it brings about a similar situation in the department of industrial arts. Most pupils will begin their work in industrial arts about the age of 12 when they are influenced more by impulse than by deliberation. Classroom methods must of necessity predominate, if, within the assigned period, a pupil is to accomplish any appreciable amount of work. This has its advantage in teaching individual responsibility, but it has its disadvantage in not putting pupils on their guard against errors and poor workmanship. Finally the school atmosphere is essentially different from that of the commercial shop, and, while principles and processes may be taught in school, the responsibility for their interpretation is brought home with greater significance in the shop than is possible in the school. The actual work in the shop has a more serious aspect than can very well be given to it in the school.

On the other hand it is useless to attempt to carry on industrial work in rooms of inadequate size or with insufficient equipment. Just what is included by these limitations may be somewhat difficult to determine, because so much depends upon the size and character of the school and the industrial possibilities of the community. What may be ample in one case may be scant in another. And still some attempt should be made, in the interest of the type of industrial training offered, to fix some minimum limitations, below which it would be educationally indefensible to go. Four states in the Union—there may be others—have sought to establish certain minimum standards for the guidance of schools offering work in industrial arts. These states are New York, Michigan, Minnesota and Pennsylvania.

New York

The New York bulletin on industrial arts applicable to grades seven, eight and nine contains the

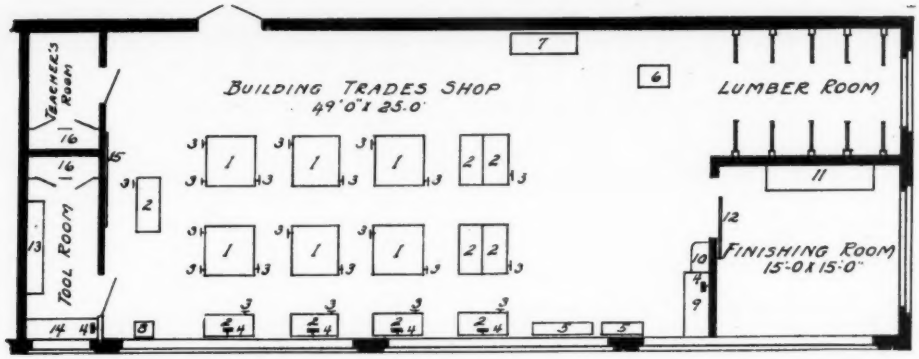

Fig. 1. A Building Trades Shop of Cabinet Work, Carpentry, Elementary Concrete Construction, Painting and Wood Finishing and Elementary Electric Work. Designed by the Division of Vocational and Extension Education, New York State Department of Education. Total Floor Area 1,750 Square Feet.

EQUIPMENT SCHEDULE.

1. Double Bench 48" x 48"
2. Single Bench 48" x 24"
3. Vise
4. Electric Wall Plug
5. Lathe 60" x 12"
6. Variety Saw 30" x 22"
7. Jointer 66" x 18"
8. Grinder 18" x 16"
9. Glue Bench 60" x 28"
10. Sink 30" x 20"
11. Zinc Covered Bench 9' x 2'
12. Sliding Metal Covered Door
13. Tool Rack
14. Bench 72" x 22"
15. Sliding Blackboard 8' long
16. Cabinet 72" x 22"

following requirements: "(a) Floor space for shop 1600 square feet; for shop with space for recitation 1650 square feet; for storage and supply closet, 100 square feet; for drawing room 1200 square feet. (b) Partitions: for separating all shops and drawing rooms, walls that can be moved easily, should it be deemed advisable in future years to readjust the original layout. (c) Light and power: daylight from one side, if possible; large windows placed close together as in factory construction; individual electric lights for all benches and machines, if other system of lighting is not adequate; outlets for all electrically driven machines; daylight proof curtains and wall sockets for lantern in all rooms used exclusively for instruction or for drawing and recitation. (d) Blackboard: each shop and drawing room should have 80 square feet of blackboard. (e) Cork board: each drawing room should have not less than 80 square feet of cork board.

"Schools equipping for industrial arts should make provision either for a two-room or a multiple room layout.

"If a two-room layout is chosen it should consist of a shop with tool and supply storage closet adjoining and a drawing room with storage closet adjoining, the drawing room serving the purpose also of a recitation room. Both shop and drawing room should be large enough to accommodate the necessary benches, cupboards, machinery, supply racks and other equipment. Supply closets should be sufficient to contain full length stock. If a room is to be used for drawing primarily, the shop should be large enough to include a section of floor space set aside for recitation purposes. This space should be sufficiently large to accommodate a teacher's bench, blackboard, bookcases and individual seats for all the pupils. The drawing room should communicate directly with the shop or shops.

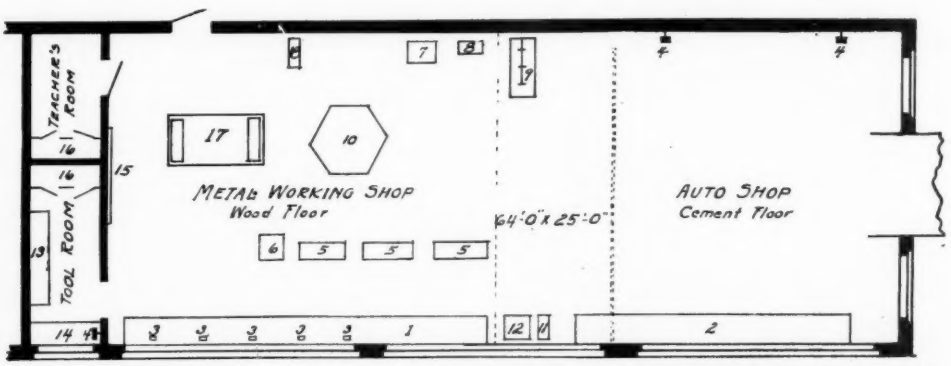

Fig. 2. A Metal Trades Shop for Sheet Metal Construction, Elementary Machine Shop Practice, Auto Mechanics and Heat Treatment of Metals. Designed by the Division of Vocational and Extension Education of the New York State Department of Education. Total Floor Area 1,750 Square Feet.

EQUIPMENT SCHEDULE

1. Bench 29' 6" x 2'
2. Bench 23' x 2'
3. Gas Buzzers
4. Electrical Plugs
5. Lathe 54" x 18"
6. Shaper 24" x 24"
7. Drill Press 30" x 18"
8. Cut Off Saw 24" x 12"
9. Wash Trough 5' x 2'
10. Sheet Metal Machine Bench 5'
11. Anvil 24" x 10"
12. Furnace 24" x 26"
13. Tool Racks
14. Bench 6' x 2'
15. Sliding Blackboard 8'
16. Cabinet 6' x 2'
17. Sheet Metal Table with Folder and Roller 8' x 4'
18. Shears 40" x 8"

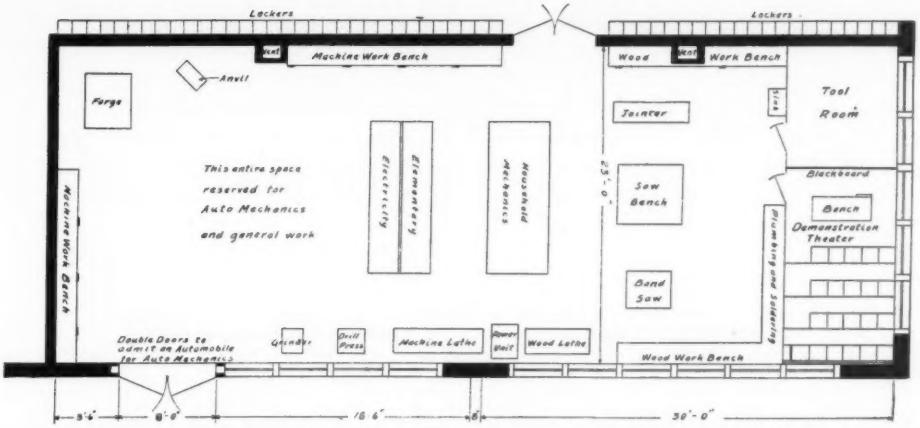

Fig. 3. General Shop for Wood Working, Metal Working, Auto Mechanics, Household Mechanics, and Elementary Electricity. Designed by the Department of Public Instruction of the State of Michigan. Total Floor Area 1,395 Square Feet.

EQUIPMENT SCHEDULE.

One Table for Household Mechanics 10′ 11″ x 4′ 6″
Two Tables for Elementary Electricity 10′ 11″ x 2′ 2″
Machine Work Bench 15′ 6″ x 1′ 6″
Wood Work Bench 13′ x 1′ 6″
Forge 48″ x 40″
Drill Press 21″ x 24″
Power Unit 30″ x 24″
Saw Bench 55″ x 51″
Plumbing and Soldering 10′ x 1′ 6″
Anvil 24″ x 12″
Sink 24″ x 15″
Grinder 22″ x 18″
Machine Lathe 6′ 6″ x 21″
Band Saw 39″ x 32″
Jointer 66″ x 18″
Wood Lathe 54″ x 22″

"If a multiple-room layout is chosen, it should consist of one or more drawing rooms and as many shops as the size and needs of the community require. In schools where several shops are maintained, one supply room may serve two shops, provided it opens into both. The shops should be arranged in units, wherever this is possible, a metal unit, an electrical unit, a printing unit, etc.

"Equipment includes (a) shop, (b) drawing room, (c) furniture, (d) books, (e) tools and machines, (f) provision for supplies. The shop and drawing room have been already discussed. Benches and seats as well as desks and tables should be of good quality and adapted to the special uses and the sizes of the occupants. There should be a complete though perhaps a limited supply of reference books dealing with the various types of work being undertaken. These should be for the pupil's rather than for the teacher's use. Tools and machines should be sufficient for the types of work underfaken and they should be kept in good condition. Supplies should be adequate at all times."

Two floor plans herewith shown, prepared by the Division of Vocational and Extension Education, and furnished by Mr. Frank H. Wood, State Director of School Buildings and Grounds Division, indicate how these requirements may be met to advantage in planning new school buildings.

Michigan

Bulletin No. 52, issued by the Department of Public Instruction of Michigan and entitled "School Buildings, Equipment, and Grounds," while not specific in regard to sizes of room, is very complete in its enumeration of the equipment essential to the work that is required in industrial arts courses. Three suggestive floor plans with equipment indicated have been prepared for the Michigan schools and have been made

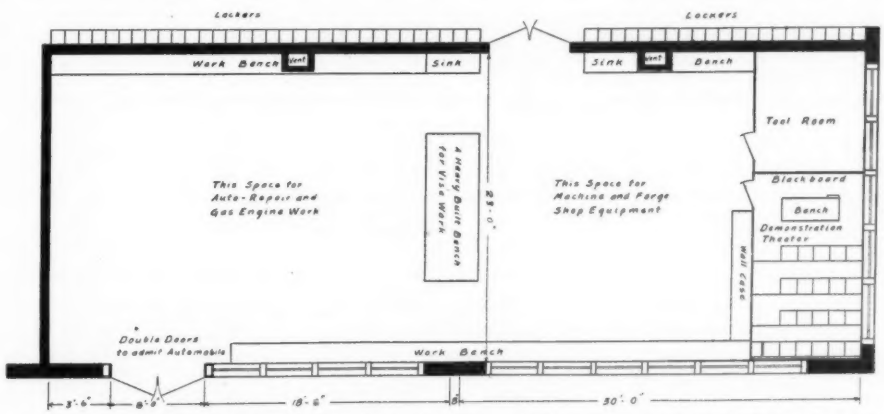

Fig. 4. A Standard Auto Mechanics and Machine Shop. Laid out and recommended by the Department of Public Instruction of the State of Michigan. Total Floor Area 1,395 Square Feet.

EQUIPMENT SCHEDULE.

Heavy Built Bench for Vise Work 11′ x 4′
Work Bench 28′ x 18″
Bench 6′ x 18″
Work Bench 38′ 8″ x 18″
Sink 4′ x 18″
Wall Case 9′ 8″ x 18″

available for this article by Geo. N. Otwell, State Superintendent of Rural Education.

The following extracts from this bulletin are worthy of note:

Junior High School, Grades 7-9. "Prevocational manual arts should begin in the seventh grade. Throughout the junior high school period its aim is distinctly prevocational and therefore as many different lines of work as possible for tryout purposes should be provided.

tional course in agriculture is taught, farm mechanics should be a part of the household mechanics course and for this purpose woodworking, metal working, and auto mechanics equipment are well adapted.

"In the larger school systems where two shops or more are possible, one should be a general shop and the others should provide more advanced work in metal, electrical work, auto mechanics, and printing."

Senior High School, Grades 10-12. "In the senior high school the work should become more specialized

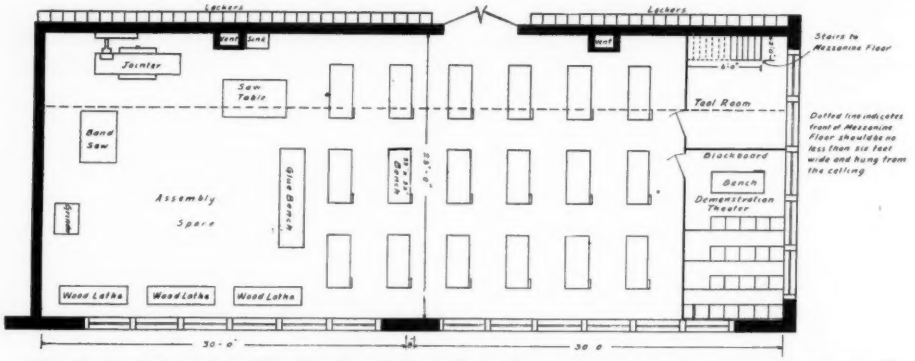

Fig. 5. General Shop for Wood Work and Farm Mechanics. Laid out and recommended by the Department of Public Instruction of the State of Michigan. Total Floor Area 1,395 Square Feet.

EQUIPMENT SCHEDULE.

Eighteen Single Benches with Vises 52" x 22"
Glue Bench 8' x 24"
Grinder 30" x 24"
Jointer 7' x 4'
Three Wood Lathes 66" x 18"
Band Saw 50" x 36"
Saw Table 63" x 36"

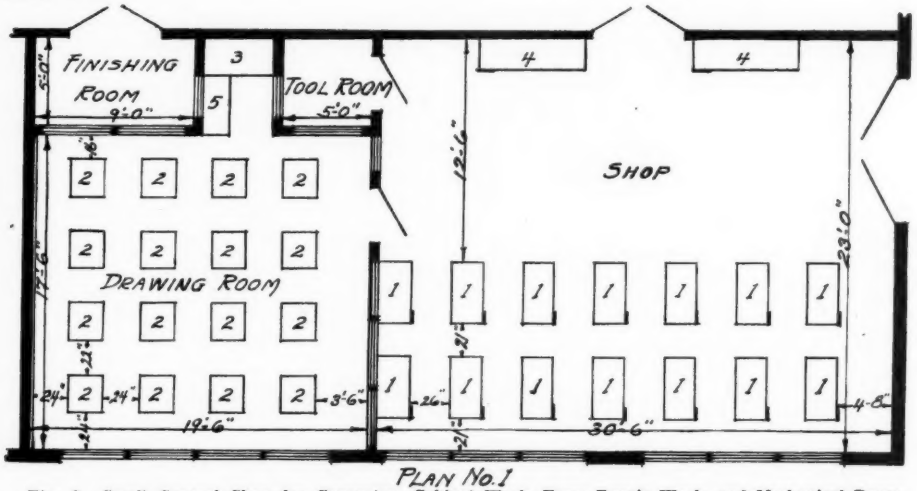

Fig. 6. Small General Shop for Carpentry, Cabinet Work, Farm Repair Work, and Mechanical Drawing for Classes of 16 Pupils. Minimum Layout for Space and Equipment, as Laid Out by the Department of Education, State of Minnesota. Total Floor Area 1,150 Square Feet.

EQUIPMENT SCHEDULE

1 Single Wood Working Bench 42" x 22"
2. Drawing Table 26" x 24"
3 Case in accordance with local requirements
4 Cabinet Benches 6' 6" x 2'
5. Teacher's Desk 42" x 22"

"In the smaller cities where only one shop can be provided, that shop should be a general shop providing, in addition to the usual wood working equipment, facilities for teaching household mechanics and elementary electrical applications in the home. The scope of such a shop can be greatly increased by the addition of a metal turning lathe, a soldering and riveting bench, and a forge and anvil. One end of the shop may be used for auto mechanics. In cities in which a vocational and vocational in nature. A metal working shop for a senior high school should provide for auto mechanics, a woodworking shop for cabinet making and carpentry, and an electrical shop and print shop for advanced work in these two lines. It is possible to conduct classes of senior high school grade in the shops described above for the junior high school.

"The equipment and furniture for woodworking is based on a class of 24 students. In new buildings,

single benches are recommended and should be arranged in rows with space between to insure freedom of work. The light should come over the left shoulder. In old buildings where it is necessary to economize space double benches may be used. In this case artificial light is usually necessary as the boys stand facing each other. Wherever possible the machines should be placed in one end of the room and floor space allowed for assembly work. No shop is complete without a tool room and provision must be made somewhere for washroom and lockers. The finishing room must be entirely separate from the shop and as dust proof as possible. Bleacher seats are recommended as they provide a place for seating during demonstrations as well as a place for pupils to make notes and drawings."

Minnesota

The minimum requirements for Minnesota are found in a bulletin entitled, "Laws and Rules Governing School Buildings and Sites," issued by the Division of Buildings and Sanitation of the Department of Education. These requirements are as follows:

"The space provided for general industrial work will depend to a great extent upon the type and amount of work to be offered, but in no case shall the floor area be less than eleven hundred twenty (1,120) square feet. The space provided may be left in one room or may be

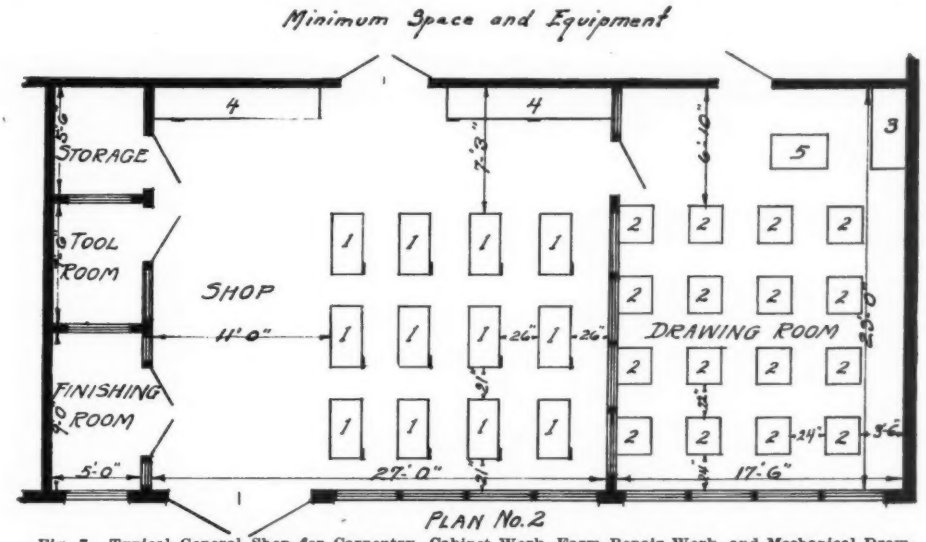

Fig. 7. Typical General Shop for Carpentry, Cabinet Work, Farm Repair Work, and Mechanical Drawing for Classes of 16 Pupils. Minimum Layout for Space and Equipment. Prepared by the Department of Education, State of Minnesota. Total Floor Area 1,150 Square Feet.

EQUIPMENT SCHEDULE.

1. Single Wood Working Bench 42" x 22"
2. Drawing Table 26" x 24"
3. Case in accordance with local requirements
4. Cabinet Benches 9' x 2'
5. Teacher's Desk 42" x 22"

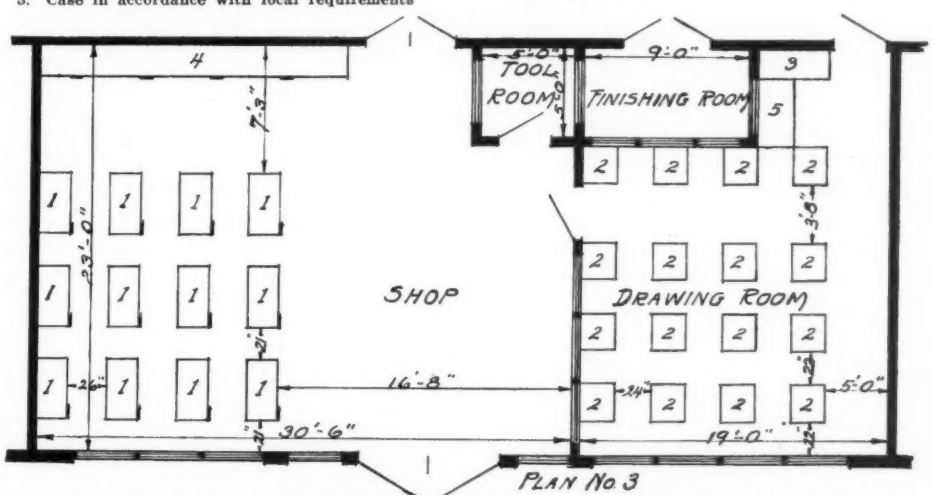

Fig. 8. Suggestive Plan for Small General Shop for Carpentry, Cabinet Work, Farm Repair Work and Mechanical Drawing for Classes of 16 Pupils. Layout for Minimum Space and Equipment. Prepared by the Minnesota State Department of Education. Total Floor Area 1,150 Square Feet.

EQUIPMENT SCHEDULE.

1. Single Wood Working Bench 42" x 22"
2. Drawing Table 26" x 24"
3. Case in accordance with local requirements
4. Cabinet Bench 18' 6" x 2' with four vises
5. Teacher's Desk 42" x 22"

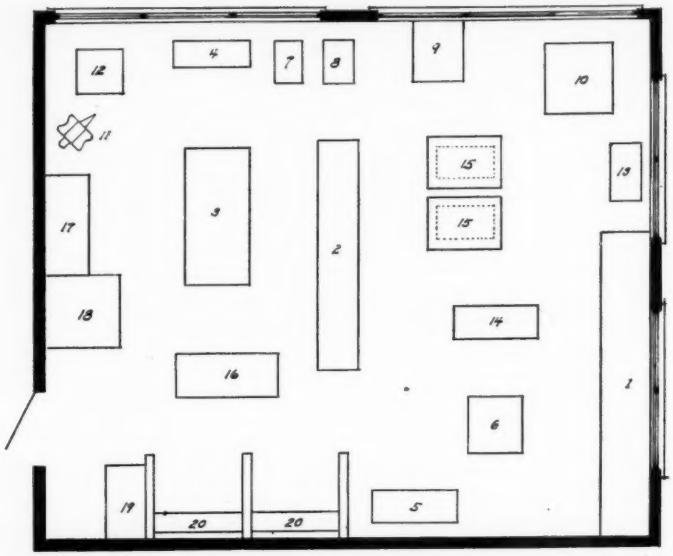

Fig. 9. Suggestive Plan for a General Shop for Industrial Arts including Concrete Construction, Blacksmithing, Sheet Metal Work, Electrical Work, Wood Work, Machine Work, and Printing. Layout Prepared by the Bureau of Vocational Education, Department of Public Instruction of Pennsylvania. Total Floor Area 864 Square Feet.

EQUIPMENT SCHEDULE.

1. Wood Working Bench 16′ x 2′ 6″
2. Machinist Bench 12′ x 2′
3. Sheet Metal Table 7′ 6″ x 3′ 6″
4. Engine Lathe 4′ x 1′ 6″
5. Speed Lathe 4′ 6″ x 1′ 9″
6. Variety Saw 3′ x 3′
7. Drill Press 2′ 6″ x 2′
8. Grinder 2′ 9″ x 1′ 9″
9. Imposing Table 3′ x 3′
10. Press 3′ 9″ x 3′ 9″
11. Anvil 18″ x 10″
12. Forge 30″ x 30″
13. Bench and Cabinet 3′ x 1′ 9″
14. Table and Stock Cabinet 4′ 6″ x 1′ 10″
15. Composing Stands 4′ x 2′ 10″
16. Electric Table 5′ 6″ x 28″
17. Bench—Concrete 5′ 4″ x 28′
18. Mixing Board 4′ x 4′
19. Teacher's Desk 4′ x 2′ 2″
20. Wiring Booths 5′ x 4′ 6″

divided into separate rooms in accordance with local requirements.

"Whenever power is to be used, provision must be made for proper connections. Any special features required by special types of work—as gas exhaust flues or dust collecting systems—should be provided for when the building is constructed.

"A door opening, eight feet wide, with double doors should be provided, giving access into this department from outside, making the whole opening available for the bringing in of large equipment or materials to be worked upon.

"Storage rooms adjoining the main room are desirable. The essential idea underlying the planning of the General Industrial room should be that of making it possible for the instructor most easily to keep in continual charge of all work going on."

In Minnesota annual state aid to the amount of $500 is made available to all school districts that comply with the requirements stated above and conduct a department according to certain standards fixed by the State Board of Education.

In order to indicate how the minimum requirements as to the physical plant may be met, three suggestive floor plans with spaces indicated for equipment have been prepared by D. M. Schweickhard, State Supervisor of Trade and Industrial Education. These floor plans, of which prints are included in this article, have been worked out after a careful review had been made by Mr. Schweickhard of the local situations in the various school districts of the state. A bulletin embodying an outline of the work to be done in General Industrial Training has just been published by the State Department of Education. This bulletin contains the following explanation of these floor plans: "It must be remembered, in examining and criticising these plans, that this is not an attempt to set forth an elaborate arrangement for a school attempting trade training on an extensive basis; it is rather an attempt to show what may be done with minimum facilities. One highly necessary feature in such an arrangement is that one teacher, who must have charge of the entire department, may be able to have the whole under inspection at all times. Glass partitions between all interior rooms, provide that pupils may be working in all parts of the shop at one time and still be under supervision of the instructor. Schools able to provide more than the minimum amount of space may wish to enlarge upon one of these arrangements, or to provide additional rooms, but wherever the instructional work is to be under one instructor, the principles upon which these plans are based, should be rather closely adhered to."

Pennsylvania

In a bulletin issued by the Bureau of Vocational Education of the State Department of Public Instruction of Pennsylvania, entitled "Bulletin No. 4, Trade and Industrial Education, Series No. 2, Industrial Arts Education in Grades 7-8-9, with special application to the needs of the smaller schools," the following suggestions are made for junior high schools of varying sizes:

1. For schools containing *100* to *200* boys: Option No. 1—one general shop, one drafting room (classroom will do); Option No. 2—Large room containing both.

2. For schools containing *200* to *400* boys: Option No. 1—One general shop (containing wood and electrical work), one general shop (containing machine and sheet metal), one drafting room (classroom will do); Option No. 2—one general shop (containing four or more activities), one unit shop (where vocational specialization is needed), one drafting room.

3. For schools containing *400* to *600* boys: Same as for smaller school with the addition of another unit shop (electric or other suitable for Smith-Hughes classes).

4. For larger schools: a. For schools of large size one shop will be needed for each 200 additional

boys or considerable fraction of this number. b. Vocational work which may be elected in the ninth grade will use one unit shop for each 40 boys.

"It is recommended that districts make use of the services of the State Department of Public Instruction, Bureau of Vocational Education, in planning equipments rather than to rely upon any standardized list. The bureau will take up each situation separately in view of the fact that local needs are not exactly alike in all districts.

"When a decision has been made as to the extent of equipment to be placed in a room, it is well to have a scale drawing made of the floor plan. Then in order that the equipment may be placed to the best advantage, the following procedure may be observed: Determine the size of the benches, machines, and floor equipment. Draw these to scale in the form of small rectangles upon thin cardboard. Cut them out and place them around on the floor plan, securing them into place on the drawing board by means of ordinary pins. A number of combinations can be tried and when the final arrangement has been made, the equipment will then be placed to the best advantage. In providing for a forge it is important to see that it is placed with reference to chimney flues."

The bulletin lists the minimum equipment for eight typical activities for classes not exceeding five boys and limits the number of activities in a shop of about 27 feet by 40 feet to not more than five. It states, however, that from a practical standpoint it is probable that in the smaller schools not more than four activities can be successfully handled, even though more may seem desirable from an educational standpoint. A suggestive floor plan giving a typical arrangement for a general shop is shown in the bulletin and has been included among the drawings for this article.

(To Be Concluded)

Science and Related Trade Information in Sheet Metal Work

Walter G. Hjerstedt, Instructor in the Lane Technical School, Chicago, Ill.

THE teaching of sheet metal work has been growing very rapidly in the last few years, not only in the number of students enrolled in vocational and trade schools throughout the United States, but also in the scope and character of the shop and related work included in the sheet metal courses.

One of the interesting and necessary developments has been the establishing of science courses which have direct connection with the steel industry and actual sheet-metal-shop practice. It is by means of interesting experiments performed in the laboratory that the mysteries observed by young students in the shop are made clear and much useful trade information is imparted.

Science especially commends itself as related work for sheet metal students, inasmuch as it may be carried on with apparatus of the most simple and inexpensive kind. Even the more elaborate experiments may be performed at a moderate outlay of money, provided the instructor employs a little patience, tact and ingenuity.

In the sheet metal shop the student encounters many mysteries of the properties of materials, processes of the trade, etc., which can be explained only by a study of science. Thus, rusting of iron, as we all know, is a slow process of oxidation. It is noticed by all sheet metal workers, but only a small percentage can give a satisfactory explanation of it. A very simple laboratory experiment and a brief study of a few elementary chemical principles will make the action of "rusting" clear. Iron nails of any sort cannot be used as fastenings of copper where exposed to heat and dampness, without resulting in the quick destruction of the fastenings. To make clear to the young worker the destructive electrolytic action between copper and iron, an experiment can be made demonstrating this most interesting fact. All materials, as well as sheet metal, are subject to variations in size due to temperature changes, and this fact can be demonstrated by actual experiment in the science class. In like manner, certain laws of physics and mechanics which enter into the construction of machines in the sheet metal shop, can be demonstrated successfully. Nature is always ready to give a satisfactory explanation to these and other mysteries provided the questions are properly asked by arranging proper experiments.

One of the marked advantages of science study beyond the important fact that it gives the student a more comprehensive view of natural phenomena than he would otherwise possess, is that it brings into play the faculty of personal observation which is too often allowed to lie dormant. In such studies as history, or grammar, we necessarily accept facts upon authority, and from that authority there is no appeal. But the student of physical and chemical science is taught to verify by experiment so far as possible, every fact brought before him, to test it by the evidence of his own senses, and to know the facts of his own knowledge. Experimentation of this kind when rightly conducted not only trains the student's powers of observation in the laboratory but in the shop as well, and increases his ability to reason correctly. And such experimentation gives valuable clues to other wonderful sciences not connected with sheet metal work, and gives the student

a foundation for the expansion of possible scientific inclinations.

To succeed in the sheet metal trade today, requires more than a practical knowledge of handling tools and being a good mechanic and draftsman. In this respect the science course conveys much practical trade information and provides the explanations for all ordinary trade methods and materials. By means of simple and useful experiments, science will be of the utmost value to the sheet metal student from a practical as well as a scientific standpoint. The student should become familiar with processes of the preparation of different kinds of soldering acids and fluxes, as well as how to tin copper and to solder properly. It is of practical value to the sheet metal worker to know how to make a permanent marking fluid to be used on galvanized iron as well as other sheet metal; how to copper plate; how to make putty; how to prepare cements for joining metal and wood; how to compound cements for leaky roofs; how to prepare pickling solutions. A few experiments will demonstrate the process of galvanizing and of plating. The preparation of a superior grade of metal paints and varnishes and the painting of iron surfaces can also be actually demonstrated by simple experiments. As the students following the sheet metal course usually come directly from the grades, no prerequisites are required, but a few elementary principles of chemistry should be discussed in connection with the above experiments. By performing these actual experiments, the reasoning powers of the boys will be increased, and the mysteries of some of the every-day troubles in the sheet metal industry will be brought to their attention.

There are many broad trade facts with which the sheet metal worker must be familiar and which are closely related to both trade practice and simple science. Thus, the sheet metal student familiarizes himself with the various forms of metal-roof construction, and the reasons for its superiority over other roofing. Very few people have heard about copper steel and even a large percentage of sheet metal workers do not know about the superiority of this most important alloy over ordinary galvanized iron. This necessitates the explanation of the effects of atmospheric corrosive conditions as applied to metals in the presence of acid fumes when exposed to the action of time and weather.

He should know why the unequal contraction and expansion of wood and metal make it desirable to use shiplap for sheathing instead of tongue and groove boards. He should understand why a good quality of building paper is necessary to form a cushion and prevent the resinous knots of the boards from coming in contact with the metal. He should know, too, why roofing plates with a heavier coating must be used for flat roofs than for steep-standing seam roofs, and why resin should be used instead of muriatic acid, or boiled acid, in laying metal roofs. Knowledge of this kind can only be obtained from the experience of others, or from personal experiments and observation. It is best taught in the school shop and proved by simple experiments in the laboratory.

In the teaching of sheet-metal-work science the student should become familiar with the technical terms of the trade so that he can use them when necessary. Such terms as metallurgy, fusibility of metals, tensile strength, alloys, matter, energy, heat and temperature, transmission of heat, description of elements important in iron and steel making, ores and the iron bearing minerals, classes of properties, which includes specific gravity, cohesion, ductility, malleability, hardness, etc., enter into the sheet metal industry directly or indirectly, and are well worth becoming familiar with. The student should be able to trace the important steps in the manufacture of sheet metal from the iron ore in mine, until the time it leaves the mill in the form of finished black plates, galvanized plates, etc. In this way, the boy who picks up a piece of sheet metal will no longer be in ignorance of the material he is handling. Likewise he will be familiar with the manufacture of iron, and the different galvanizing and tinning processes.

Heating and ventilating enter into sheet metal work. It is very important that the student should become familiar with the fundamental principles and know something about the operation and construction of ordinary furnaces used in the homes.

In comparatively recent times, human learning has become so extensive and so complex that the fundamental sciences have been divided into sections and have been applied to various callings and trades. The teacher of sheet metal has the entire range of readily available material in physics, chemistry, electricity, etc., to draw upon in working out a course of study for those desirous of entering the sheet metal industry. If teachers take advantage of the work already done, and actually begin to sort in a systematic way, what they find in existing reference books and courses of study, they will find that the preparation of courses in the science of sheet metal work proceeds with amazing smoothness.

Following are the outlines for several experiments which may be given in a sheet metal class. They are simple and not too technical to be understood by the average boy who takes up vocational training. The apparatus and materials necessary are simple and may be found ready at hand in almost any school. In making these experiments, teachers must remember that experiment is the language through which we question nature, and we have no more right to address her in slipshod and careless terms than we have to employ uncouth and ungrammatical speech in our conversation with those around us.

CONTRACTION AND EXPANSION

Object: To prove that contraction and expansion is dependent upon heat and cold.

Apparatus:

1. Bunsen burner.

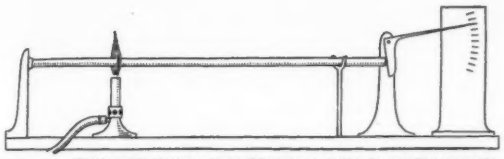

FIG. A. ILLUSTRATING EXPANSION AND CONTRACTION.

2. A long copper rod fastened at one end while the other end presses against the short arm of a pointer which moves on a scale. See Figure A.

Material:
1. Base.
2. Graduated Dial.
3. Pointer.
4. Three Supports.
5. Copper Rod.

Operation:
1. Place Bunsen burner below rod.
2. Move Bunsen burner back and forth so that the whole of the rod is thoroughly heated.
3. Note effect on pointer.
4. Remove Bunsen burner and allow rod to cool.
5. Note effect on copper rod.

Result:
1. The pointer rises as the rod becomes heated.
2. The pointer lowers when copper rod becomes cold.

Conclusion:
1. When pointer rises proves that the copper rod expands and becomes longer when heated.
2. When pointer lowers proves that the copper rod contracts and becomes shorter when cooled.
3. Heat is a vibration of molecules; the faster the vibration the higher the temperature; the slower the vibration the lower the temperature.
4. All roofing materials are subject to variations in size and temperature changes.

OXYGEN

Object: To prepare oxygen.

Apparatus:
1. Bunsen Burner.
2. Ring Stand.
3. Test Tube.
4. One Hole Cork.
5. Two Rubber Tubes.
6. Straight Glass Rod.
7. Bent Glass Rod.
8. Wide Mouthed Bottle.
9. Water Tray.
10. Mortar.
11. Pestal.
12. Ground Glass Plate.

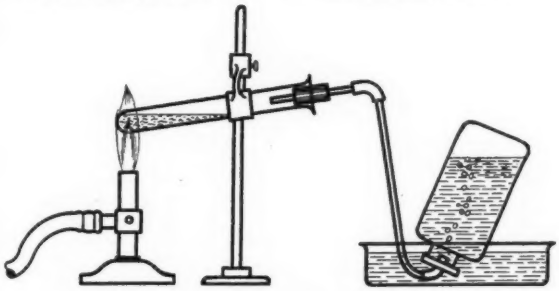

FIG. B. PRODUCING OXYGEN.

Material:
1. Potassium Chlorate.
2. Manganese Dioxide (MnO_2)

Operation:
Arrange apparatus as shown in Fig. B.
2. Weigh out 5 grams of potassium chlorate and 3 grams of manganese dioxide.
3. Mix and grind them thoroughly in your mortar.
4. Put mixture into test tube.
5. Fill wide mouthed bottle clear up to the mouth with water.
6. Turn bottle upside down in a water tray, taking care to keep the mouth under the water so that the outside air can't get into the bottle.
7. Heat the test tube quite hot until all the water is driven out or displaced by the oxygen.
8. Slip one of the ground glass plates under the mouth, holding it on tight, and take the bottle out of the basin turning it right side up and put it on your bench.
9. The bottle is filled with oxygen.
10. Light a match, blow it out, and thrust the glowing coal into the bottle containing oxygen.
11. Note the effect.

Results:
1. The glowing coal instantly bursts into a flame and burns very brightly as long as there is oxygen in the bottle.
2. The hot coal of the match is mostly carbon and combines with the oxygen and forms carbon dioxide. This process is called oxidation.
3. Combustion: All combustion or oxidation is the rapid combination or union of something with oxygen, accompanied by flames or evidence of a high temperature. When a coal fire burns, the coal unites with the oxygen of the air. In this particular case oxidation is very rapid but sometimes it is very slow and gradual.
4. Oxidation: When iron is exposed to moist air the oxygen of the air slowly combines with it and forms ferric oxide, or rust, as it is called. This slow union with oxygen, such as we may observe in rusting metals is called oxidation. When iron rusts, the surface combines with the oxygen of the air and rusting results. Iron rusting is a slow process of oxidation, and so slow that the heat produced is not sufficient to be noticed. The rust which appears may be thought of as ashes. The formula for the union of oxygen and iron is as follows:

Iron+Oxygen=Ferric Oxide

$Fe_2 + O_3 = Fe_2O_3$

5. Spontaneous Combustion: Sometimes a mere oxidation develops into a combustion, which is then known as spontaneous combustion. Such a situation often arises when rags saturated with oils used in making paint (linseed oil and turpentine) are left about, instead of being placed in a closed can, or, better still, at once burned.
6. In making oxygen the manganese dioxide that you put into the tube did not give off any oxygen but it helped the potassium chlorate to give it off faster. Any substance which has this peculiar property of aiding a reaction without being changed itself is called a catalytic agent. Catalytic comes from two Greek words which mean down and the act of losing, of losing down. The manganese dioxide remains unchanged and the oxygen in the potassium chlorate is set free.

SOLDER

Object: To make 50-50 solder.

Apparatus:
1. Bunsen Burner.
2. Retort.
3. Fire Clay Crucible.

Material:
1. Lead.
2. Tin.
3. Plaster of Paris.
4. Pencil.
5. Box Cover.

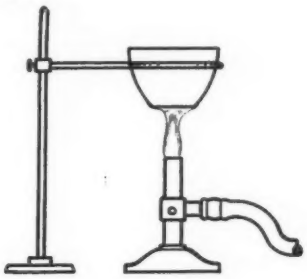

FIG. C.

Operation:
1. Place fire clay crucible in ringstand and place Bunsen burner underneath. See Figure C.
2. Into crucible put equal parts by weight of lead and tin.
3. Light Bunsen burner, using a small flame at first, gradually increasing the temperature until all of the metal has melted down to a uniform mixture.
4. For shaping the solder into sticks, have at hand a Plaster of Paris mould. (Can be made by mixing the Plaster of Paris in a box cover and while still soft pressing into it two or three lead pencils. See Figure D.)

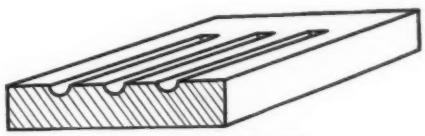

FIG. D. SECTION OF MOULD.

5. Into these depressions pour the moulten metal and allow it to cool and solidify.

Conclusion:
Solder is an alloy of lead and tin and as a low melting point only is necessary the simple apparatus suggested above may be used. For those alloys of a higher melting point either a forced draft or some form of electric furnace will be necessary.

Inference:
One important fact about solder is its low melting point. It is lower than that of lead alone and can, therefore, be used in making Experiment N.

SOLDERING ACID

Object: To prepare soldering acid (Chloride of Zinc).

Apparatus:
1. Wide Mouthed Bottle.
2. Two Hole Rubber Stopper.
3. Thistle Tube.
4. Rubber Tube.
5. Glass Tube.
6. Glass Nozzle.

Material:
1. Hydrochloric Acid (Muriatic Acid—Commercial name for Hydrochloric Acid).
2. Zinc Chips.

Operation:

FIG. E.

1. Set up apparatus as shown in Figure E.
2. Place a few pieces of zinc (zn) in wide mouthed bottle.
3. Partially fill the bottle with water.
4. Add about 10 cubic centimeters of hydrochloric acid (ho) and watch the action that takes place.
5. If the above quantity does not produce any visible results add more acid until bubbles rise to the surface of the liquid.
6. Light end of glass nozzle with a match.

Result:

1. Bubbles rise to the surface of the liquid.

2. Gas escaping from nozzle bursts into a flame when lighted with a match.

Conclusion:

1. The bubbles rising from the surface of the liquid are the hydrogen gas escaping. Hydrogen gas can be prepared in this way.

2. Zinc united with the hydrochloric acid and formed zinc chloride. See equation below.

3. This soldering acid or flux is also called boiled acid.

4. It is used for all work and most commonly used.

5. When the acid has gone through this process it is said to have been "cut" or "killed."

6. Zinc chloride is used for soft soldering, copper or brass work, though if the metal to be soldered is dirty, it should be cleaned with raw acid. The raw acid should be washed off before applying the boiled acid.

7. Zinc chloride is exceedingly corrosive, making its use inadvisable for certain classes of work, especially in electrical work when fine wires are to be soldered.

Interference:

In preparing zinc chloride for shop work the only apparatus necessary is a glass beaker or receptacle. Prepare in the following manner: Fill beaker or glass receptacle one-fourth full of hydrochloric acid. Add an equal amount of water. After the solution has been thoroughly mixed place a few small pieces of zinc into beaker. (The zinc should not be added too rapidly, as a very violent chemical reaction may take place and crack the beaker.) Enough zinc should be added until the hydrogen bubbles cease to rise to the surface of the liquid.

Caution:

1. If possible do not prepare this flux indoors as the fumes are disagreeable and injurious to the health.

2. When preparing soldering acid for use, care must be taken that a naked flame is not brought into the vicinity, as the gas given off during the reaction is explosive.

Chemistry:

1. Equation: Hydrochloric Acid+Zinc=Zinc Chloride+Hydrogen.

$$HCl+Zn=ZnCl+H$$

2. Law of Chemical Change:

When the zinc was placed in hydrochloric acid, it was in some way acted upon by the hydrochloric acid. It became soluble, and disappeared into the liquid. When a piece of material changes its properties, it has, in doing so, become a new substance. Experiment illustrates the second fundamental law of chemistry and is called chemical change, or interaction or reaction. A material forming one or more substances, without ceasing to exist, may be changed into one or more new and entirely different substances.

Questions:

Are the following substances elements or compounds? Specify in table below.

Substance	Element	Compound	Symbol
Hydrochloric Acid			
Zinc			
Chloride of Zinc.....			
Hydrogen			

PROCESS OF SOLDERING

Object: To learn the process of soldering two pieces of metal together.

Apparatus:

1. Gas Furnace.
2. Soldering Copper.
3. Jar for Soldering Acid.
4. Joint to Be Soldered.
5. Small Brush.

Material:

1. Bar of 50-50 Solder.
2. Chloride of Zinc.

Operation:

1. Place soldering copper in furnace.

2. Clean the surfaces to be soldered thoroughly, by filing or scraping, so that no grease or rust is present. This is especially true of old work. Unless all the dirt, rust and grease are removed the solder will not adhere.

3. Place the two metallic surfaces together and apply the soldering flux to the joint with a small brush. Do not spread the flux over a wide surface.

4. Take soldering iron which has been properly heated in furnace and melt off sufficient solder for your joint from the bar of solder. A clean, smooth, well tinned copper of proper shape is necessary and the proper flux must be used. The metal being soldered must be heated to a temperature above the melting point of the solder.

5. Allow the solder to flow on and between the parts to be joined.

6. Apply the hot soldering copper to the joint, so as to cause the solder to become uniformly fluid, and smooth its exposed surface to give the joint a neat appearance.

Conclusion:

1. If the copper is of the right heat, the solder will melt and remain on the iron.

2. If the copper is too hot the solder will melt and run off the iron.

3. If the copper is too cold the solder will not melt.

4. A fine, pure grade of solder should always be chosen, so that the maximum of strength may be assured the joint which has been made.

Caution:

1. Do not overheat the soldering copper or the tin will be burnt off.

2. Do not work fast as the heat must flow ahead of the solder which takes time.

3. Do not run back and forth over the joint but move in one direction.

4. Do not move the newly soldered joint until it has had time to set.

5. Do not allow an oxide or scale to form on the copper or joint.

6. Since the muriatic acid, out of which the solution is made, would burn or eat holes in cloth, care should be taken not to splash any of the solution on the clothing.

INK

Object: To make a durable marking fluid.

Apparatus:

1. Test Tube.
2. Piece of scrap sheet iron.
3. Pointed hard wood stick.

Material:

1. Hydrochloric Acid (Muriatic Acid).
2. Copper filings.

Operation:

1. Pour a small amount of hydrochloric acid into test tube.
2. Add copper filings to hydrochloric acid.
3. Copper filings may be had by using up old pieces of scrap copper that cannot be used for anything else.
4. Leave solution stand for two or three days until acid has had a chance to dissolve the copper.
5. Dip pointed hard wood stick into solution made a few days previous.
6. Mark piece of scrap iron to be used for this purpose.
7. Allow to dry.

Result:

1. After leaving solution stand for a few days, the liquid becomes a dark greenish color.
2. The copper filings were dissolved by the hydrochloric acid.

Conclusion:

1. This solution may be used on galvanized iron as well as other sheet metal work.
2. When fluid is applied to the metal and allowed to dry it becomes black and permanent.

Chemistry:

When copper filings are placed in hydrochloric acid the copper filings disappear. They combine with the acid and form a green liquid. If this liquid is poured into a china dish and heated, in a short time the liquid has disappeared and green crystals remain. The green crystals are copper chloride.

Equation:

Copper+Hydrochloric Acid=Copper Chloride+Hydrogen

$$Cu + 2HCl = CuCl_2 + H_2$$

SOLDERING LIQUID

Object: To prepare a solution soldering liquid.

Apparatus:

Beaker.

Material:

1. Lactic Acid.
2. Glycerine.
3. Water.

Operation:

Dissolve one part each of lactic acid and glycerine in eight parts of water.

Result:

Conclusion:

The liquid is claimed to possess the advantage over zinc chloride of not being corrosive or injurious to the health of the workman.

TINNING THE COPPER

Object: To learn how to keep your soldering copper in the proper condition.

Apparatus:

1. Gas furnace for heating soldering copper.
2. Soldering Copper.

Material:

1. Block of Salammoniac.
2. Solder 50-50.

Operation:

1. Clean copper by filing until all dross and scale has been removed.
2. Light gas furnace and regulate aperture through which air passes so that the flame has a blue appearance.
3. Place soldering copper in gas furnace and heat for a few minutes until the point has been reached where it begins to show red.
4. Remove soldering copper from furnace.
5. Rub point of the soldering copper on block of salammoniac which cleans the surface and prevents a scale of oxide to form.
6. Melt a small amount of solder on the salammoniac.
7. Rub the copper back and forth upon the sal ammoniac, working the solder into each of the four surfaces.

Result:

The four surfaces became bright with a coating of tin and lead.

Conclusion.

Your soldering copper must be kept in this condition at all times to do good and efficient work.

Inference:

Sal ammoniac or chloride of ammonia as it is sometimes called, is used in galvanizing iron and soldering. The commercial article comes in the form of fibrous white crystals and is generally obtained as a by-product of gas works.

Caution:

Care should be taken not to inhale the fumes when soldering copper is applied to sal ammoniac as the fumes are poisonous and injurious to the health.

Industrial Arts Sketching — Part IV*

USING THE GRAPHIC LANGUAGE

Carl L. Svensen.

THE GRAPHIC language has become an essential part of our industrial life and has been subjected to changes and modifications necessary to render the greatest usefulness in the various fields of application. The different uses of sketching have influenced the development of certain "graphic idioms" and "colloquial expressions" which have become common practice.

Sketching practice, shape description, and size specification, as previously treated, form the basis for this practical use of the graphic language, and the various conventional treatments. Time has ever been an important factor in industry and many conventional and simple representations have been devised to save time. Others are designed to avoid a possible false impression of the shape or construction and to make the views easier to read.

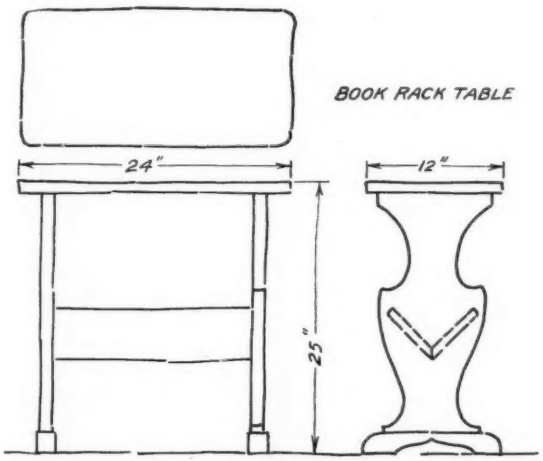

FIGURE 1.

A few general uses of sketching may be indicated. These are capable of being extended to include a very wide range of purposes. The first representation of a new form is generally a sketch. This is developed or "thought out" by making additional sketches until a scale drawing is made. Sketches are often used to give the necessary information for making details or constructing simple objects of wood or metal, machines, furniture, building features, etc. Sketches are used to give information for the reproduction of a broken part or to order a new part. Other uses are, to help interpret or read an assembly drawing by sketching separate parts, to work out or record ideas, to explain industrial thought, to work out positions of parts or relative motions of parts, to study shapes and designs, and for graphical presentation of information.

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There are two principal kinds of sketches, thinking or idea sketches and working sketches. Either kind may be further divided into detail, assembly, or diagram sketches.

Design sketches are sometimes made approximately to scale by using cross section or squared paper. Details can be sketched in this way when scale drawings are not going to be made. A design sketch is essentially a thinking sketch and is often less complete

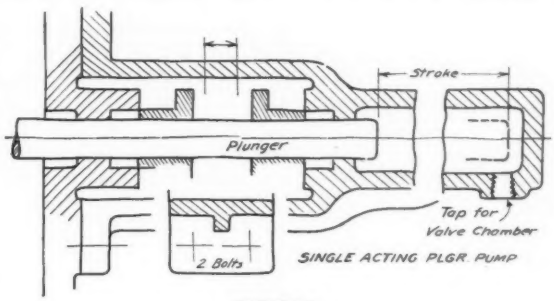

FIGURE 2.

in detail than a working sketch. It may simply indicate the general character of the appearance as for a piece of furniture, Fig. 1, or it may give interior detail as for the mechanism, Fig. 2.

Assembly sketches are sometimes necessary to designate parts or their location. Often the parts are numbered on the assembly and on the separate detail sketches thus insuring their identity. When a part is right or left hand, or when the assembly may be either way, an outline assembly can be used to tell which is R or L, and the direction or point of view.

Assembly sketches may be in section or outline, with little or much detail, depending upon the purpose for which they are intended.

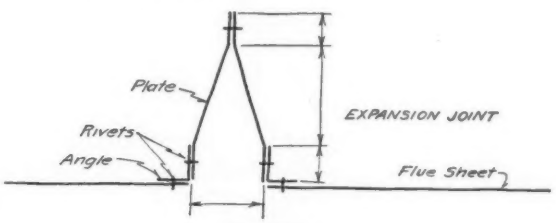

FIGURE 3.

A very useful field for sketching is that of diagrams in which little or no detail is shown. They are often made up of lines and symbols, which serve to show positions or to indicate the various parts. Sometimes dimensions and notes are added. Piping, wiring, shafting, structural outlines, mechanisms, and many other kinds of work can be "thought out" or specified by diagram sketches. A steel plate detail is shown in Fig. 3, and a shafting sketch in Fig. 4.

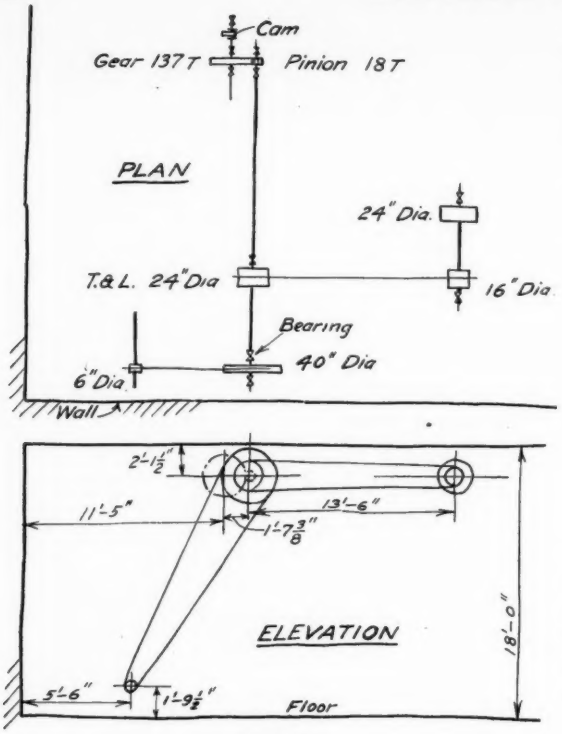

FIGURE 4.

In the use of the graphic language for sketching purposes there are a number of ways through which the views can be simplified. Most of these methods are used on mechanical drawings, as well, and serve the double purpose of simplifying the views and making them easier to read. A few of the fundamental conventional treatments are illustrated for both exterior and sectional views.

Note in Fig. 5, that lines of intersection need not be shown. It is better to keep the full diameter or main outline as in the right side of lower view of A. The true projection is indicated in the partial extra view at B. The bosses and holes of C, Fig. 5, are treated in the same way as shown in the front view, where the lines of the large cylinder are given preference.

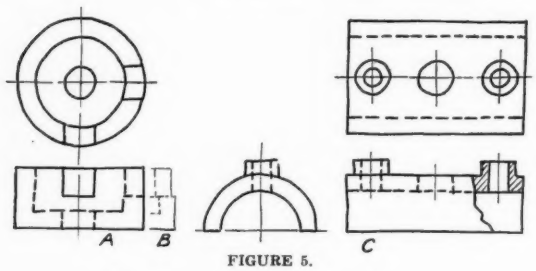

FIGURE 5.

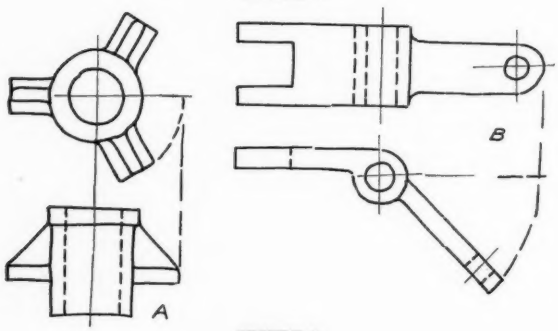

FIGURE 6.

Another method of simplifying the views and at the same time giving a better description of form is indicated in Fig. 6 at A and B. One view shows the angular position and the other view shows the true shape by considering a part to be revolved parallel with the plane of representation. A cylindrical hinge and bent plate are treated in the same way in Fig. 7 where developed views are given.

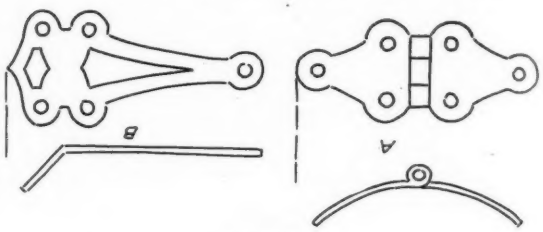

FIGURE 7.

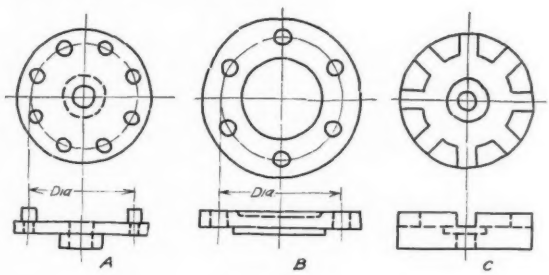

FIGURE 8.

Bolt holes, notches, etc., are represented in number and position in plan, while the elevation is simplified as at A, B, and C of Fig. 8.

The conditions under which these variations from true projection are used are well defined and must not be confused with an incorrect representation. Good practice in the treatment of sectional views is indicated in Figs. 9 and 10.

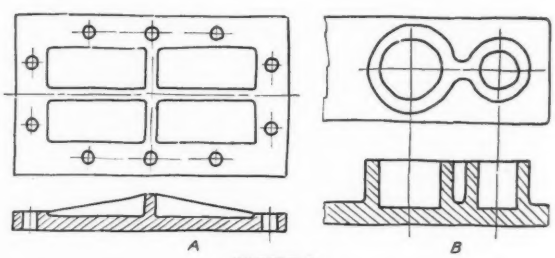

FIGURE 9.

A rib should not be sectioned as the resulting view would give a false impression. Two correct treatments are shown at A and B of Fig. 9. Other parts such as pulley arms, shafts, bolts, etc., are left in full on sec-

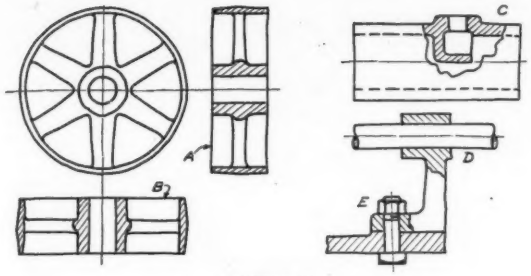

FIGURE 10.

tional views as in Fig. 10 where the views represent good practice.

When long pieces are represented a better sense of proportion will result if a break is shown. Sketches are not made to scale but awkward proportion is misleading and should be avoided. Several examples indicating that the entire length of a piece is not

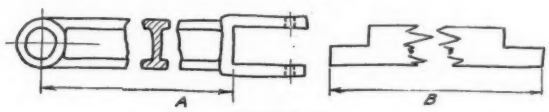

FIGURE 11.

sketched are shown in Fig. 11. The break line may indicate the material and the shape. On architectural sketches a straight line with repeated V's is used to indicate that the part omitted is the same as on each side of the break lines. "Set-in" sections or partial "breaks" are often convenient for describing a shape on a one view sketch, Fig. 12.

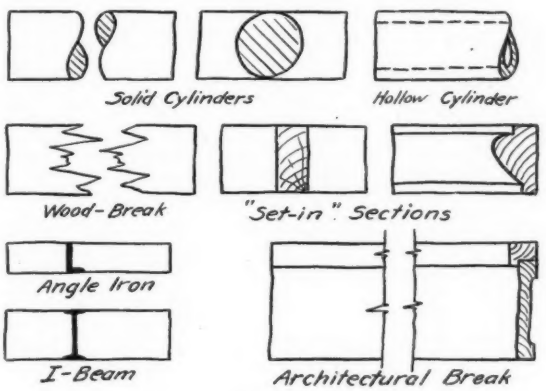

FIGURE 12.

The true orthographic projection of a screw thread involves the drawing of helices, and when the frequency with which the screw threads occur is considered, the necessity for using a "shorthand" or conventional representation can be understood. Fig. 13 shows a few of the many thread representations in use. For thread forms and many other details a book on machine drawing should be consulted.

In general bolt heads are best sketched showing the heads across flats, as in Fig. 13. Note that the head is twice as wide as thick and that the thickness is slightly less than the diameter. Methods of sketching

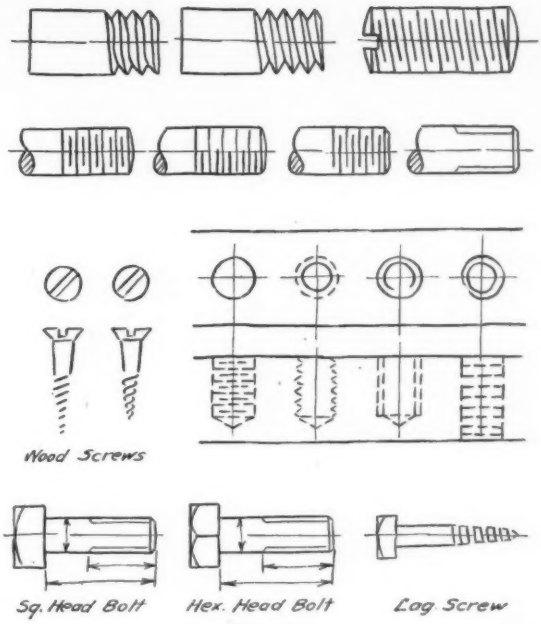

FIGURE 13.

other forms of screws, fastenings, and threaded holes are given in the same figure. A note is always desirable and it is often well to state threads per inch, form of thread, and depth of hole.

A great many symbols are used for familiar or common features. Some of these symbols are standard and others vary more or less. They all save a great deal of time and serve their purpose as well as true sketches in detail. A few typical symbols are given in the illustrations for different kinds of sketches.

Piping and other diagrammatic sketches necessitate the free use of symbols or conventional representations. A variety of piping symbols is given in Fig. 14. Sketching is especially valuable for preliminary layouts of piping and similar work. Ideas can be made clear and the number and kinds of fittings can be checked. Where only a small amount of work is to be done, a

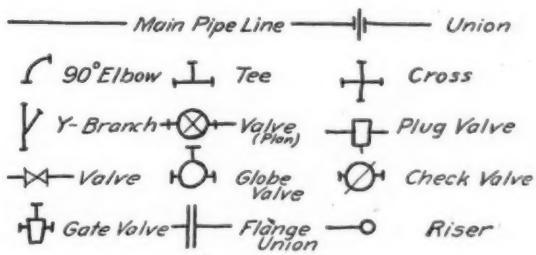

FIGURE 14.

sketch can be fully dimensioned, from which a list of pieces can be made with lengths, sizes, kinds, etc.

The symbols of Figs. 15 and 16 are used to indicate common electrical features. Complete sets of symbols for electrical equipment, wiring, etc., are those of the American Railway Association, the National

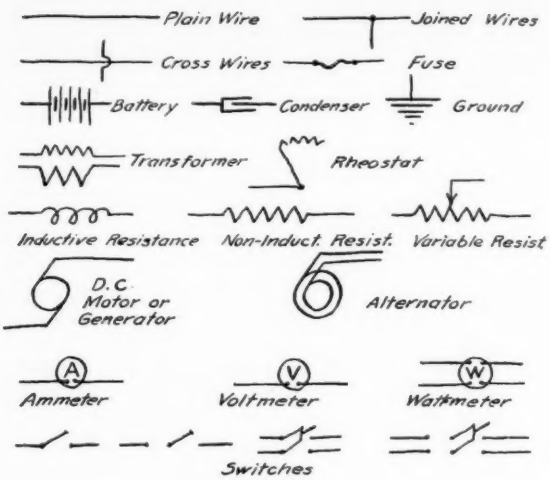

FIGURE 15.

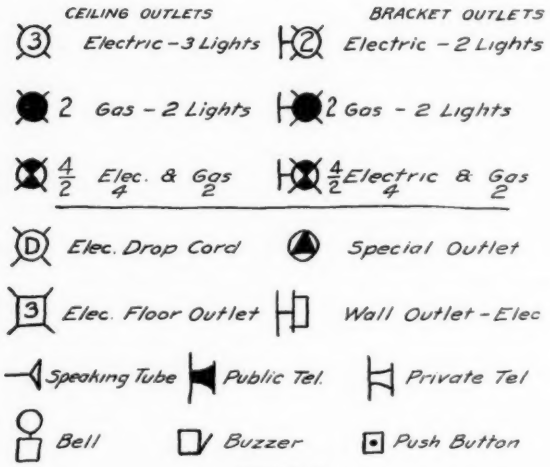

FIGURE 16.

Electrical Contractors' Association, and the "Rules of Practice" of the United States Patent Office.

The principal features of concern in architectural sketches of buildings are the location of walls, partitions, columns, windows, doors, stairways, etc., and the representation of such details in conventional form. A simple sketch plan is shown in Fig. 17. It is not necessary to show every nail or screw in wood construction. Methods of framing or joining may be shown or not depending upon their importance under the particular circumstances.

In sketching plans, the walls may be shown with single or double lines. If of brick, the space between the double lines should be sectioned or "filled in." Sketch the general outline of the building in correct proportion, then the main partitions and smaller divisions. For a row of columns sketch the main center line and cross center lines. Finally locate doors, windows, stairways, etc. The small size of sketch plans makes the showing of details impracticable, and symbols such as those given in Fig. 17 are employed.

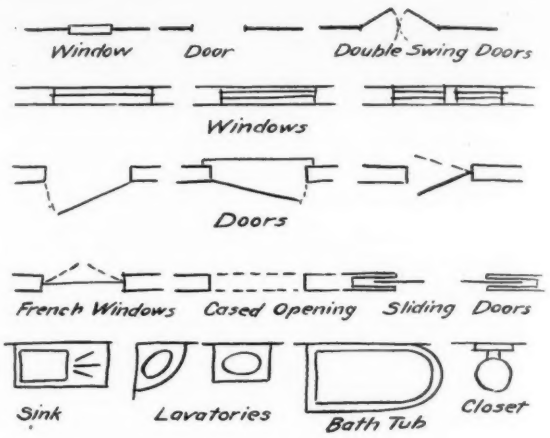

FIGURE 17.

The symbols represented in the various illustrations cover the more common features such as may be used on sketches. If others are needed reference to the handbooks of the various trades and professions will disclose the character and extent of symbols for the particular field considered.

A study of this and the preceding articles will show that the making of a practical and complete working sketch requires a thorough understanding of the four basic divisions of the graphic language which are:

1. Materials and Technique.
2. Shape Description.
3. Size Specification.
4. Practical Modifications.

The actual making of the sketch consists of two parts, representation and specification. The representation requires a consideration of the choice and treatment of views, proportion, conventionalization, etc. The specification involves a consideration of size—dimensioning, measuring, etc.—materials, workmanship, assembling, and finish.

More in detail, the making of a working sketch might be itemized as follows:

1. Consider character of subject of sketch.
2. Consider proportions.
3. Consider number and arrangement of views.
4. Consider treatment of views.
5. Block in the views.
6. Sketch in details and complete the views.
7. Add *all* necessary dimension lines.
8. Insert dimensions.
9. Add notes, title, etc.
10. Check entire sketch.

The various phases of the graphic language in use as touched upon in this article will serve to indicate the broad field of usefulness for industrial arts sketching. It is by no means a complete survey of the subject; for each of the trades, industries, and professions has a wide range of applications which must be learned as a specialized subject.

Modern Methods of Cylinder Presswork

Robert F. Salade.

MAKING ready on flat-bed cylinder presses is an art—work that requires artistic taste and craftsmanship as well as mechanical skill. The expert cylinder pressman thoroughly understands the operation of practically all makes of cylinder presses, and is capable of making ready all varieties of forms on any style of press. In the writer's opinion, it takes from five to ten years for the average cylinder pressman to become an expert in his line, and even after a period of ten years or more "at the game," the wide-awake pressman is still learning new facts about cylinder presswork.

It is, indeed, an art for a cylinder pressman to make-ready a spacious form of book pages, catalog pages, or magazine pages, in such a perfect manner that every one of the many thousands of type characters in that form prints sharp and clear. But, even a more difficult work than this is making-ready a form containing a large number of halftone plates, the make-ready work bringing out the color value of each plate to a point of excellence. And, what is still a more wonderful art is the make-ready work applied to process color plates. Here is where the cylinder pressman may exercise his craftsmanship to the greatest advantage, studying the color value of each plate with the eye of an artist, and by means of overlays, underlays and regular make-ready bringing out every shade, hue and tint of color as they must be printed to achieve the best results.

No two forms which come to the cylinder pressman are ever exactly alike. One form consists almost entirely of hand-set foundry type; another is part foundry type and part machine composition; still another consists of halftone plates with a few lines of type set under, or rather at the foot of each plate. Numerous forms contain sections of small type and other sections of brass rule. Some forms are made up entirely of numbering machines. There are forms made up of solid plates for printing a background in tint; forms consisting of a number of electrotypes; forms of type, rule and border; and, forms made up exclusively of machine composition. The experienced cylinder pressman understands how to make-ready all of these different kinds of forms as they come to the pressroom; in fact, he has been trained to handle any kind of form that may be delivered to him during the regular course of work, and it is his business to study and solve any problem which may arise in connection with the work being done on the cylinder presses under his care.

The trained cylinder pressman knows instinctively what make-ready work will be essential for a form immediately as he looks over the matter in the form. Such knowledge can come only through years of practice. In a like manner, the expert pressman knows exactly the grade of printing ink needed for each grade of paper stock; the quantity of ink and flow of color necessary for each form; the length of time required for each lot of printed sheets to dry, and many other technical points of this class.

There are various good makes of the modern two-revolution, four-roller, flat-bed cylinder presses on the market, the largest sizes of which will deliver a printed sheet as large as 50x73½ inches. There are two-color cylinder presses which print two colors at one operation on sheets up to 46½x69½ inches. There are high-speed, flat-bed, two-revolution, four-roller perfecting presses which print one color on both sides of a sheet in one operation. Large numbers of the "pony" size cylinder presses are in constant use on the smaller varieties of cylinder presswork. Moreover, there are several thousand job cylinder presses of various makes now in service, but the technical information in this article relates principally to the larger sizes of cylinder presses.

To obtain the highest quality of presswork from them, cylinder presses should always be set upon a solid foundation. Having recognized this fact, numerous printing and publishing firms have installed all of their cylinder presses upon a solid concrete foundation on the ground floor of their building. One well-known printer has gone so far as to have his cylinder presses set upon a foundation of solid rock on the ground floor of his plant. The result has been that he has not only gotten the finest quality of presswork, especially in cases of close register color printing, but there is less wear on the plates used. He is also in a position to operate the presses at a higher rate of speed than would be possible were the presses set upon an ordinary wooden floor.

When cylinder presses are placed upon the upper floors of a building, even where the floors of the building are of concrete, there is bound to be vibration with the heavy machinery in motion. In some old buildings, where a large number of cylinder presses are installed upon wooden floors, the vibration is so great as to cause trouble with the presswork; quads, spaces, leads and furniture frequently work up in a form and make strange marks on the printed sheets; sections of type matter often work "off their feet"; printing plates which have been tacked to plain wood bases are sometimes loosened by the irregular action of the press, and perhaps cause serious damage before the press can be stopped. The vibration of a building also causes undue wear on a cylinder press as well as hard wear on the surface of every form run on the press.

In cases where it is not practicable to set cylinder presses upon a rock foundation, or upon one of concrete, the next best thing is a well-braced wooden floor.

Stout oaken planks should be placed beneath the frame of each press in such a position that they will cross the floor beams. If the floor beams are at right angles to the side-frames of a press, a plank should be put underneath of each side-frame, the long way, and the ends of each plank are to be bolted through the floor to the beams. If the floor beams are parallel to the side-frames of the press, from four to six of the planks (according to the size of the press) should be placed under the press, at right angles to the side-frames, and the ends of each plank bolted through the floor to the beams. The oaken planks generally used for this purpose are one foot wide and three inches thick, planed smooth on all sides and free from knots.

After the planks have been firmly bolted into their proper positions, the side-frames of the press are to be bolted to the planks. Before this is done the press should be made level, both lengthwise and crosswise. Both the side-frames and the tracks of the press should be tested with a true level, and any low sections which may be discovered may be raised by the process of driving thin wedges of hardwood between the planks and the side-frames. A press that is firm and level will run easier and last longer than one that is not level. A sheet of zinc should be placed underneath each press (before planks have been bolted down) to catch oil and grease. It is an easy matter to clean the surface of the zinc with a piece of cotton waste.

A new cylinder press should be oiled several times a day with the best grade of machine oil, while an old press should be oiled at least twice a day. The most convenient, efficient and economical power is an individual electric motor operating in connection with a semi-automatic controller. The semi-automatic controller permits of the press being operated at various speeds as may be desired; permits the press to be operated from any number of remote points; prevents the blowing of fuses; allows the press to be brought to a quick stop when necessary, and has other advantages which would take too much space to fully mention here. The individual motor plan eliminates the use of overhead belting and shafting which would be a source of dust and dirt to the work being produced on a cylinder press.

The air springs of a cylinder press should be regulated to provide for different speeds, but the essential adjustments can only be attended to by an experienced pressman. The cushion heads are mounted on a screw rod and can be moved back and forth to allow for an increase or decrease of speed. For example, if the regular speed of the press is to be doubled, the cushion should be made four times as stiff as before, while if the speed is to be trebled, the cushion ought to be nine times as stiff. The front-center cushions are to be somewhat stiffer than the back-center cushions, and at all times the heads must be set to give a free and easy reverse.

Occasionally it is necessary to reset the cylinder of a cylinder press so that it will print perfectly from a type-high form, the standard type-high measurement being .918 inch. This is done by first removing the bed bearers, and then placing a small printing plate which is exactly type-high on the bed of the press, under the point of impression, between the cylinder and the bed. If the type-high plate can be moved under the cylinder without touching the surface of the cylinder, it is then necessary to lower the cylinder by means of the adjustment screws to a point where the printing plate cannot be passed under it without driving the plate through with a piece of furniture and a mallet. This adjustment must be made at both ends of the cylinder.

The bearers are also to be accurately type-high throughout their full length, and a type-high gauge is a most useful tool in making these adjustments. Worn bearers can be raised to type-high by removing them and underlaying them with strips of thin zinc, copper or hard fiber paper. Of course, the cylinder must first be made type-high before worn bearers are raised to type-high.

As to the thickness of tympan, or "packing," to be placed on the cylinder to provide for make-ready, the thickness will naturally vary according to the size and contents of each form, and also according to the weight and finish of the paper stock to be printed. Some pressmen prefer using two sheets of thin press-board as a foundation, while other pressmen use one sheet of thick press-board for the same purpose. The press-board is to be cut long enough to lap over the two edges of the cylinder, and the board is then to be lightly scored or creased so that it may be folded and smoothly attached to the cylinder. The special grade of hard fiber board which is widely used as a foundation will last for a long time without having to be changed for a new board. Over the press-board is drawn a sheet of Manilla paper to hold the board firmly to the cylinder, and a permanent foundation is thus formed.

The rest of the packing is to be built up gradually on the cylinder as the make-ready work proceeds. For example, over the permanent packing are drawn two or three sheets of strong book paper, and underneath these is placed a few loose sheets of book paper which can be removed later on when the make-ready is applied. Upon its completion the entire make-ready is to be covered with a stout Manilla draw sheet, or "top-sheet."

At times it may be necessary to move the grippers and shoo-fly fingers to provide for the handling of different kinds of stock. After the right amount of packing has been applied to the cylinder, the grippers may be reset, or moved to positions desired. The press is turned to a point where the grippers are closed and where the cam is just clear of the closing pin; all of the grippers are then loosened, and the cam is allowed to rest against the stop. The cam is then raised to place a sheet of cardboard between it and the stop. All of the

grippers are to have the same "bite" on the paper to be printed, and the set of each gripper can be tested by placing under it a sheet of paper and trying to pull it out—if the sheet holds tight, the set of the gripper is correct.

The shoo-fly fingers are to be set so that they will not rub against or interfere with the bands, and so that the shoo-fly rod may be taken out of the cylinder and clear other parts. When the grippers and shoo-fly fingers have been properly adjusted, the press is turned over on the impression to the point where the grippers are opposite the sheet bands. These bands are then to be loosened and moved to positions along the rod where they will clear the grippers and shoo-fly fingers. The middle bands are then set so that they will closely hold the sheet against the cylinder, but the end bands are set so that they will have less pressure against the sheet than the middle bands, thus allowing wrinkles to work out of the sheet as it goes around with the cylinder. With some classes of work it is advantageous to hold the sheet tightly against the cylinder throughout the printing operation. To accomplish this strong linen tapes are fastened to the band rod, passed under the cylinder and are secured to the rod under the feedboard. These tapes must be arranged in such positions that will place them in margins and other blank sections of the form when the sheets are printed.

The feed-guides may be set when the press is turned to a position where the grippers close. Once the feed-guide cam has been correctly set it will require no further adjustment, but whenever the guides are moved they must be set so as not to bear on the guide tongues—the guides are to just about touch the tongues. The guides should rise just in time to clear the sheet when the grippers close, and should they fail in this, the cam must be set ahead and secured at a point where they will clear without disturbing the sheet.

To insure true register in the feeding of the sheets, drop guides are placed on the press, and when correctly adjusted, the drop guides will firmly hold each sheet to the feedboard while the grippers are taking hold of it. When setting the drop guides the cylinder should be in the position where the grippers have just closed on the sheet, and the adjusting screws are to be set so that the wires of the drop guides bear on the sheet just as the feed-guides are about to lift.

Setting the inking rollers on a cylinder press is a process that calls for experience. Not only should all of the rollers be set level, but their positions should be carefully regulated so as to prevent unnecessary friction. All of the composition rollers should be set to have a light contact with the ink plate and metal vibrators. The rollers are to be adjusted so that each roller when inked will leave a film of ink about one-quarter inch wide all the way across the ink plate and vibrator, this line of color proving that each roller leaving it has the right pressure.

When setting the ink fountain, the pressman usually begins with the middle thumb-screw, then works alternately with the other thumb-screws, to the right and left, being careful not to set any of the screws too tightly. It is a good plan to set the fountain so that it will give a medium supply of ink, then to regulate this supply of ink by means of the pawl. By giving the pawl a longer or shorter throw, the amount of ink taken up by the drop roller to the ink plate may be increased or decreased without changing the set of the thumb-screws.

Apprentices should be informed of the fact that the steel roller for an ink fountain is turned and ground perfectly round throughout its full length. It should be, therefore, carefully handled when it and the fountain are being washed to prevent even the slightest dent or scratch in its smooth surface. A fountain roller can be damaged by dropping it upon the floor, or by a careless person stepping on it. A fountain roller which is no longer perfectly round cannot be expected to give a uniform supply of ink from the fountain.

After the press has been put into proper working condition, the form is placed on the bed of the press and the make-ready work is started. First, several sheets of white book paper are run through the press together so that one of these sheets will have a sharp impression of the form. The pressman lays this printed sheet upside down upon a make-ready board and minutely studies the "topography" of the impression: Some parts of the impression are weaker, or lower, than others; some parts are higher than others. The weak sections are outlined with a black pencil on back of the sheet, an exceedingly low place requires two or three outlines of different sizes. For example, a small oval is first marked in the middle of a weak place, then around this is marked another oval of larger size, and around this second oval is marked still another one of larger size. Tissue paper is to be pasted on the back of the sheet as indicated by the pressman's markings. In the case of a place having three markings of different sizes, a piece of tissue is pasted over the smaller diagram first and trimmed according to the pencil marks with a make-ready knife; then another sheet of tissue is pasted over the first piece and trimmed according to the shape of the second diagram; and, finally, a sheet of tissue is pasted over the second piece and trimmed to the size of the third diagram. Practically this same process of "marking-out" and "spotting-up" is followed all over the back of the sheet at points where stronger impression is needed.

This make-ready sheet, which is also called a "sheet-overlay," or a "patch-sheet," is to be placed in the proper position on the cylinder of the press. To do this accurately, an impression of the form is first taken on the surface of the packing on the cylinder; the sheet-overlay is cut at its corners so that it may be registered with the printed detail on the cylinder; then

the sheet-overlay is pasted in the right position on the cylinder, the press being turned slowly as the sheet is firmly and smoothly applied. Over the top of this make-ready is drawn another sheet of white paper, and an impression of the form is taken on this, to provide for any additional make-ready that may be required. The Manilla draw-sheet is then put on over the white sheet.

In the case of a form containing sharp rules, dotted leaders, or line engravings which are above type-high, it may be necessary to cut out this sharp detail from a printed sheet, and then paste this sheet on top of the sheet-overlay. When a form contains worn type, rules, and a number of printing plates (like a form of advertising pages for a magazine, for instance), two or three sheet overlays may be essential to complete the make-ready.

Forms consisting of electrotypes, stereotypes or machine composition sometimes require an *underlay*-sheet in addition to overlay-sheets to make them print well without applying exceedingly heavy impression. An underlay-sheet is placed underneath the form.

To save time and labor, as well as to obtain the best results in presswork, all electrotypes, halftones, etchings, and stereotypes should be mounted on patented base. There are various kinds and makes of patented plate-mounting systems on the market, including self-contained base which is made to sizes to fit the beds of cylinder presses, no chase being needed to hold it. When printing plates of any kind are mounted on patented base, the make-ready work often includes *interlays* which are placed between the plates and base. The interlays are particularly effective for *vignetted* halftones. The vignetted halftones should be a little less than type-high when mounted on base so as to allow for the thickness of the interlays.

In well-managed printing plants proofs are taken of all new halftones immediately as the plates are received, and overlays are cut from these proofs before the halftones are locked up and sent to the pressroom. Thus, when a pressman receives a form of halftone plates the overlays are all ready for the job, and the pressman pastes these overlays in true positions on the packing of the press after the usual overlay-sheets, or patch-sheets, have been put on. One overlay is cut from proofs of French folio so that when pasted together all solid "black" detail of the halftone subject will be raised two thicknesses of paper, all "dark-gray" detail raised one thickness of paper, all "high-lights" depressed two thicknesses of paper, and all "light-gray" detail depressed one thickness of paper.

Status of Industrial Arts in Junior High Schools

A. P. Twogood, Iowa City, Ia.

ALTHOUGH the majority of cities and towns having junior high schools have established very satisfactory aims for their industrial arts departments to work toward, there is much variation in the methods by which they hope to accomplish these aims.

First, it may be well to get clearly in mind just what is meant by industrial arts. It is manual training made broadly educational by the transformation of raw materials into a finished product of value. This implies, then, that it is a new type of manual training, a type which is thoroughly practical as well as cultural. In this day and age the old "excuse" for manual training—to coordinate the mind and hand—is hardly satisfactory; for coordination alone will not make the boy a more useful worker and citizen. Real information must accompany the coordination.

There are three distinct purposes for which the industrial arts are given in the junior high school: (1) for the enrichment of the general curriculum; (2) for the development of the student's interests in industrial occupations; (3) for the acquisition of a more or less limited degree of manipulative skill. Each purpose requires a distinct type of curriculum.

When given solely for the enrichment of the general curriculum industrial arts assumes the form of manual training in which the appreciative element is stressed. The shop work is usually restricted to wood working, through which the student should learn to distinguish several of the more common styles of furniture. He should know something of the history of the various styles in order that he may more fully appreciate the difficulties of furniture building in early days. This study, followed out, would involve a study of woods and the lumbering industry; of the present methods in the manufacture of furniture as compared with the old hand methods; of the different kinds of finish used; the kinds of varnish, their sources and methods of manufacture; and of the care of furniture, a very much neglected study today. All of this, however, is given from the viewpoint of appreciation, and not for its practical value.

The second purpose, that of developing the student's interest in industrial occupations, is the one advanced by the majority of junior high schools today. The junior high period is largely a period of exploration and elimination. The pupils are from 12 to 16 years of age, too young to make any definite selection of a vocation; and yet at an age when they begin to think, more or less, of what they wish to do in the future. For these there must be provided a series of try-out courses, none of which involves much detail or length. The common period is from six to nine weeks per unit. In this period the student is given a taste of

the particular occupation which he is studying, and under conditions similar to those met on the job if possible. In this way he will receive, in the course of a year, a brief insight into from four to six different occupations, some of which will appeal to him. Thus, there is a partial elimination in the first year. During the second year the process is repeated with new courses substituted for the ones eliminated, so that by the end of the year he will have arrived at some conclusions as to what occupation he wishes to follow. During the third, and last, year of junior high he is given a more specialized training along his chosen line which will prepare him either for a fair job, or for further specialization in the senior high.

The third type of curriculum attempts only to develop in the pupil as much manipulative and technical skill as possible, in order that he may go out into the industry and take his place on a level with many of them already there. He is not concerned with the "why" of this or that. This touches on the field of the purely vocational school, yet it differs because of the differences in ages and capacities of the students of the two schools. This kind of a shop is usually organized on a commercial basis to manufacture some product for the school.

The number and kinds of activities given in the school shop depends largely on the industries in the community. One of the requirements to receive federal aid for senior high school courses under the Smith-Hughes law is that the community's industries must be sufficiently large in order to absorb all the workers turned out by the school, without producing an oversupply of labor. Nor is it possible to train workers for every occupation a community may have. In some occupations there may be a demand for only two or three new workers each year. Specialized training for these would be too expensive. Under such conditions the occupation must be carefully analyzed to determine what fundamentals it has in common with other occupations of the community. These fundamentals are then incorporated into other courses.

The industrial arts department may extend its influence into the social life of the school through the organization of an industrial arts club. During the course of the year speakers may be secured to talk to the club on the opportunities and requirements for different occupations. This plan gives a first-hand insight into occupations in general, and particularly in the surrounding community. Industrial films may be secured to illustrate the steps in the manufacture of some article.

While the progress of industrial arts has been slow in the junior high school it has been based on sound principles, and it is only a question of time until the industrial curriculum will be as strong, and as popular, as any other curriculum.

Instrumental Drawing as an Aid to Design

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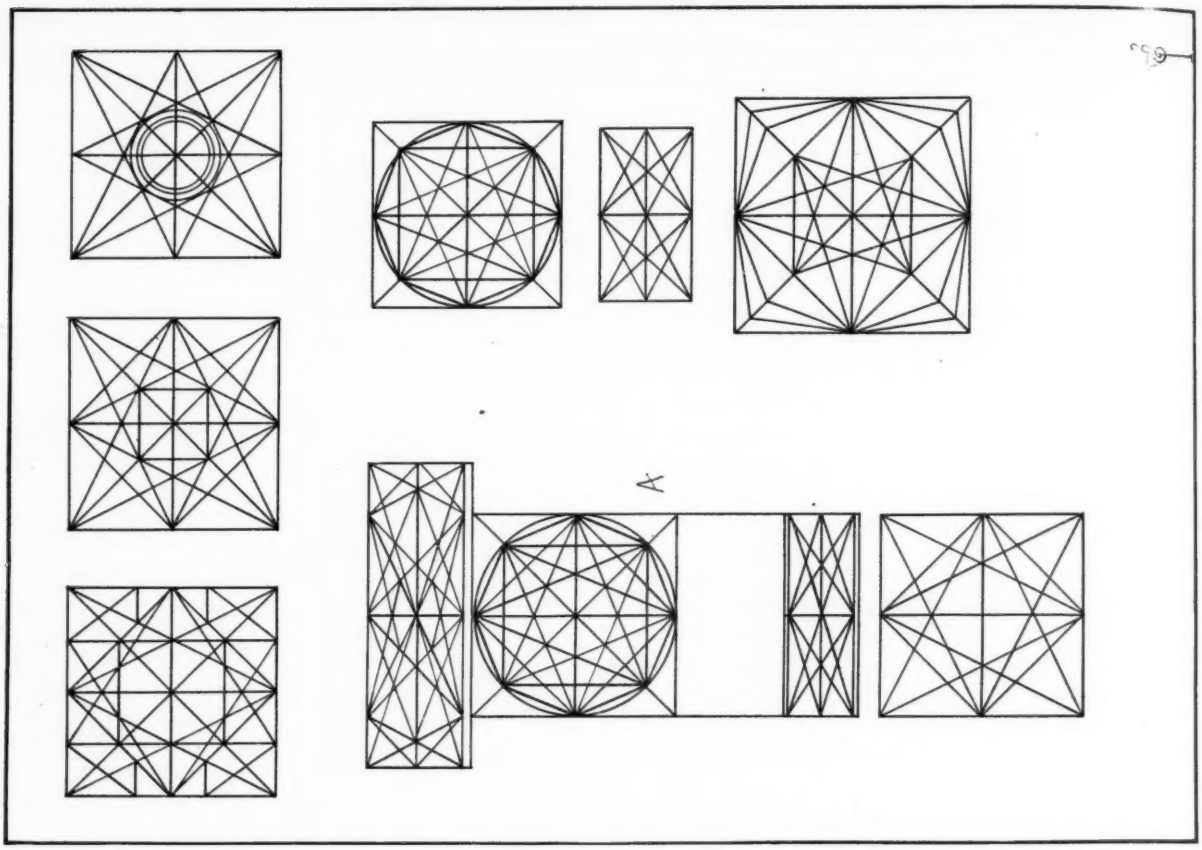
THE REACTION against everything mechanical or "tight" in design is to some extent justified in cases where there is a lack of freedom, or failure to conform to the elements of beauty. On the other hand, students of pure design very often remain ignorant of the possibilities for design motives based on geometric forms. Even a hasty study of the history of ornament will reveal that a good many of the finest examples of design are entirely dependent on their geometric pattern for their effect. Gothic tracery, Roman mosaic, Indian lattice patterns, Arabian designs, etc., clearly show that the basic structure for even the most intricate design has involved a knowledge of instrumental drawing.

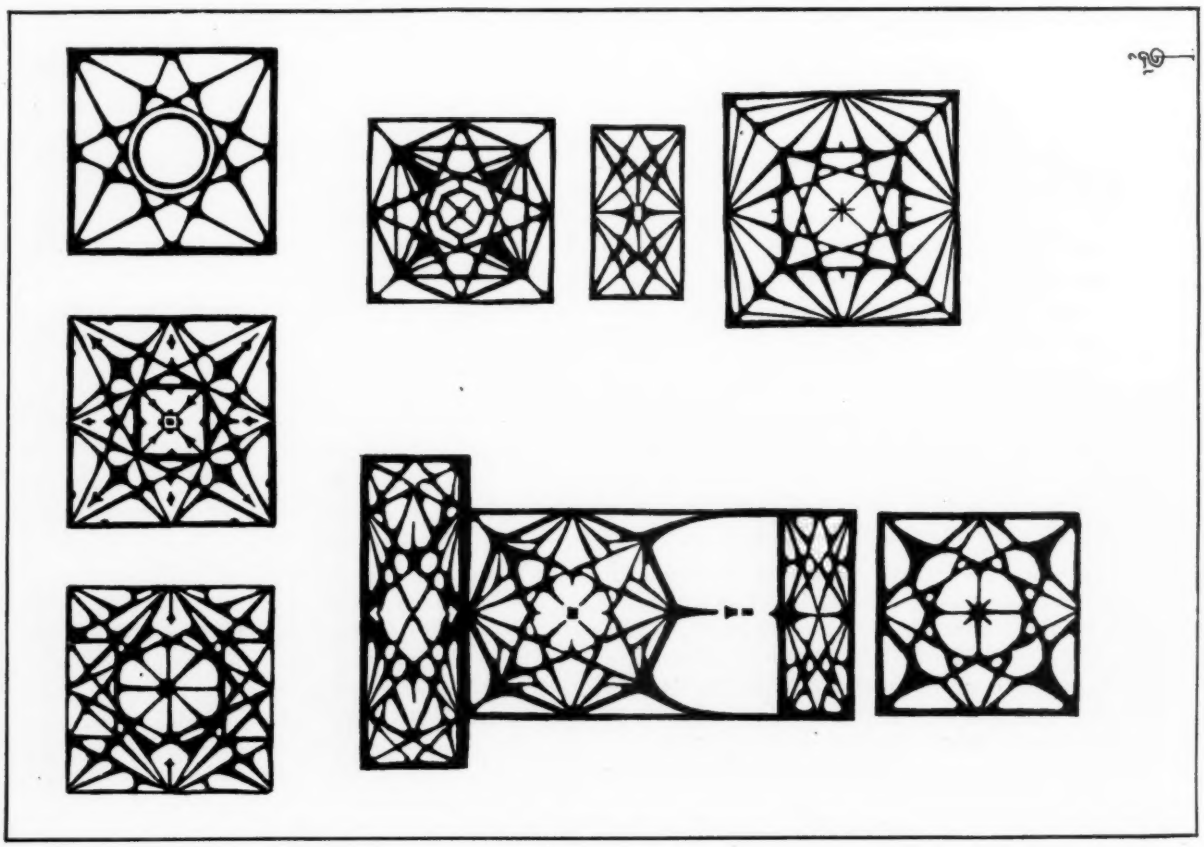
Teachers of design, even those teaching the theory of pure design for esthetic values, are beginning to realize more and more, that as an educational factor, a problem of an abstract motive demonstrating a design principle, becomes more vital to the student when connected with a tangible project. Since the principles of pure design apply to any realm of art, whether it be painting, sculpture, furniture design, or the decoration of a box, the actual demonstration and application of these principles to every day objects will bring about a closer union between theory and practice.

My experience with students leads me to believe that those students who have had some training in mechanical or instrumental drawing, and who have become interested in the study of design, have a decided advantage over those students who have not had this training. In projects involving three dimensions, they are able to think around the object more clearly and are, therefore, able to obtain closer unity between plan, elevation, and end view. Where the design is merely two dimensional their work is usually more orderly and decidedly cleaner in appearance.

Mr. Hambidge's rediscovery of the law of dynamic symmetry clearly demonstrates that beautiful proportions and harmoniously related areas can be scientifically obtained with the use of a T square, triangle, and compass. It seems logical to my way of thinking that every student contemplating the study of design, whether it be merely for cultural or for practical purposes, should have some knowledge of the use of these instruments. The reason for my belief is that in the first place, added enjoyment will result from the recognition of works of art based on geometric pattern,



GEOMETRIC FIGURES WHICH SUGGEST DESIGN MATERIAL.



DESIGNS DEVELOPED FROM GEOMETRIC FIGURES.

and in the second it is absolutely essential for practical work.

The two accompanying plates demonstrate a problem which could be worked out to good advantage by students who are unfamiliar with the use of the T square, the triangle, and the ruling pen. The problem is to design a decorative lamp shade to be used to form part of the decorations for the gymnasium or another room for a dance or social function. The frame work for the shade may be any shape desired. It should be made of light strips of wood. After the shape of the frame work has been decided upon, the areas enclosed by the frame work are broken up by squares, triangles, and their diagonals (Figure A). Next, the design based on these lines is worked out on a piece of tracing paper laid over the structural lines. In this way several different designs can be made, and the best one worked out in India ink over the ruled lines. Sheets of tracing paper are next cut to the sizes of the areas formed by the frame work (a quarter or half inch edge should be allowed for gluing the paper onto the frame). The structural lines are next drawn onto the full sized sheets of paper and inked in. A very pleasing effect will be obtained by filling the white spaces left in the design with transparent washes of water color; this gives the shade an effect similar to stained glass. Color should be used sparingly so as not to cause the paper to wrinkle. The colored sheets are next glued onto the wooden frames, and the lamp shade suspended from the light. Plan to have the electric light bulb well inside of the shade so as to throw light through the tinted tracing paper. A very effective party could be given in which all the decorations and the costumes are based on these geometric motives.

To the student of design an opportunity is offered through this problem to learn something about instrumental drawing, which is not disassociated from the study of design and involves all of its principles. The student of shop work may find occasion to apply the same principles to some project in his class.

GEOMETRIC FIGURES WHICH SUGGEST DESIGN MATERIAL.

DESIGNS DEVELOPED FROM GEOMETRIC FIGURES.

A KITE CARNIVAL

A total of five hundred kites were flown simultaneously on May 26th, 1923, in Rock Island, Illinois, on the occasion of the first annual Kite Carnival. One thousand delighted boys and men and more than fifty girls took part in the carnival and voted it to be the most interesting and novel contest which the community had ever witnessed. The day was ideal for kite flyers and even though the trees and the field bore witness of some disasters, the carnival was a complete success and proved to be most valuable from an educational standpoint.

The contests were conducted under the direction of Mr. A. W. James, supervisor of the Manual Arts Department of the Rock Island schools. The kites were made according to a plan outlined and constituted regular projects in the manual arts classes.

The contests were based on the following classifications: (a) animal kites, (b) artistic kites, (c) best large flying kites, (d) best tailless kites, (e) best small flying kites, (f) highest flying kites, (g) strongest pulling kites, (h) most original kites, (i) best string of kites, (j) best reels, (k) best kite banner.

Prizes were awarded through the courtesy of the Rock Island Rotary Club and considerable publicity was given to the event by the local newspapers.

WHY MORE ART TRAINING

"A majority of college graduates go out into the world with little or no knowledge in art," says George C. Nimmons in a circular issued by the United States bureau of education.

The art training proposed by Mr. Nimmons is not professional preparation, such as regular schools of art give, but only such training as will give all students in colleges, no matter what their callings are to be, a sufficient understanding and knowledge of the arts to be able to appreciate them properly.

Art training for the farmer, fruit grower, or ranchman, would go far toward prevention of the abandonment of farm life, in the opinion of Mr. Nimmons. There is scarcely a ranch or a farm that could not originally have been made into an attractive or beautiful place without additional expense had the owner only possessed knowledge of architecture and landscape gardening sufficient to enable him to take advantage of his natural surroundings and the possibilities of his building problem. Men in the professions have to do with products of art when building improvements are made or new buildings erected—courthouses, hospitals, churches, schools, and colleges.

The importance of art training to the home is obvious, for the house itself, its furnishings, and its immediate surroundings, should be artistic. A man reflects his own character and standard of taste when he builds a home, and his children form their ideas of taste and refinement from that home as they grow up in it. In public life as a citizen the college graduate who has had no art training can not serve his community to its best advantage in connection with the public improvements that must be made.

THE ROCK ISLAND KITE CARNIVAL.

BRUCE-MILWAUKEE

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

TRAINING ART TEACHERS

No more important pedagogical enterprise is before the schools and country than the training of teachers for instruction in the Industrial Arts. Interest in Art Education has reached the point where most educators are ready and willing to pronounce the development of esthetic judgment in reference to life and the commodities of life a fundamental school obligation. With this obligation before the schools the need of teachers who can carry on effective instruction in art is recognized. At present the art instruction of the schools is in the hands of teachers who have natural abilities in the arts but little ability to teach or in the hands of teachers who have little conception of art in relation to life. One great difficulty lies in the subject as distinct over other school subjects. Art may never be taught by the academic textbook method. The creative instinct must be exercised and developed and applied to definite projects which include a wide range of interests. The teacher must therefore have not only natural ability in one line of work but must have a wide experience in many lines. The teacher can be trained. The artist can be trained only on the basis of natural aptitude. Both training and natural aptitude are necessary to the teacher of art.

Much indignation is expressed by art teachers who are denied credit toward college degrees for ability to draw or paint or model or design. Even acquaintance with periods and effects in historical design are given little credit by those who grant college degrees. Art history is not recognized as of especial importance by the majority of teachers of history in college. The history of art is but a minor study in most of our American colleges. Technical art is taught in but a few of our American colleges and is given little credit toward a degree. With all of this lack of opportunity for the teacher of art to study the subject and get a college degree for that study, the college degree is held as a measure of ability to teach and as a standard of education. High school teachers must have college degrees in most advanced school organizations. How is the art teacher able to hold place with teachers of other subjects when their particular subject of study is not credited? Why is it not credited?

Perhaps it is the vague, undefined standard set upon art by artists and teachers of art that leads the school authorities to belittle the educational value of art instruction. Artists and art teachers are given to the disparagement of drawing as a necessity to art or art instruction. The emotional quality of a work of art is always emphasized as the most important element, as it must be; but what is this emotional quality as a measurable standard for college credit?

Is it not possible for the schools to educate through drawing, modeling, design, and a study of the principles involved? Is it not time for art teachers to seek a method of instruction comparable with the study of language and literature which has a distinct content of teachable subject matter? Can it be true that there is no such content in art?

To acknowledge a lack of definite, informational content in the study of art is to consign the subject to a minor place in the school curriculum. The art teacher must be as well trained in the formal use of graphical effect as the English teacher is trained in the use of language. Form and color must be used for the expression of particular kinds of impression. Each school subject has been developed into an instrument for education by teachers who have formulated methods and subject matter for instruction. Art must be so formulated. The art teacher must be trained in the use of art as a means of instruction and educational development before credit is due. The great difficulty of giving the subject proper place lies with the teacher. No subject can be forced upon the schools in response to the judgment of a few enthusiasts. Each subject must be proven by results. Art is no exception to this rule.

IMPORTANCE OF PERSONAL QUALITIES

Personal characteristics are often the most vital considerations in the selection and retention of teachers, without regard to the subjects which they teach. Teacher training institutions and departments of education sometimes ignore this fact. In our eagerness for technical preparation, knowledge, and skill, we sometimes forget vital factors of every teacher's success.

Matters of personal cleanliness, dress, refinement of manners, correctness of speech, courtesy, consideration for others' opinions and other kindred social qualities are of the deepest concern to those employing teachers. This part is one of the reasons for the personal interview so universally demanded by those who employ teachers. They do not insist on a personal interview in order to learn of one's educational qualifications, degrees, skill in teaching, and general experience. Such items of information are in the employer's hands before he asks or grants an interview. The interview satisfies the employer on points of personal qualities and general bearing of which no degrees, no experience and no testimonials can give assurance.

Many a teacher of excellent training and experience has lost his chance at a good position by an uncouthness in dress, a crudeness of manner or a lack of attention to some other purely personal habit or characteristic

when interviewing a prospective employer. Many a good position or promotion has been lost through bad table manners.

There are those who will contend that such things are not so important as they have here been made to seem. Others will argue that these personal qualities and attainments are desirable but not necessary to the successful performance of the actual duties of the position. The fact remains nevertheless, that, granting anything like equal qualifications and ability, the position will always go to the person of strong and attractive personality instead of the person with uncultivated personal and social qualities.

Furthermore, the things that have been emphasized here are not for the most part *natural* traits; they may be *acquired* by almost any normal person who will set himself resolutely to the task. Since this is true, it seems tragic to find great strong, natural ability, education, and experience nullified and rendered ineffective, if not useless, by indifference to matters of personal care, hygiene, and habits. A teacher owes it to himself as well as to others to appear at his very best.

VOCATIONAL TRAINING AND AMERICAN INDUSTRIALISM

The transition in the industrial life of the nation namely, that transition whereby the old-time apprentice system is rapidly becoming obsolete and whereby mass production has been introduced—has brought into life the vocational training now exemplified under public school auspices.

The industrial and educational forces readily recognized the fact that if the country was to continue its production efficiency, these two forces would have to join hands in recruiting the army of skilled mechanics that enter the workshops. Without these the manufacturer could not produce successfully, supply domestic demands or compete with foreign markets. Europe had not only resorted to advanced methods in securing world trade but had cultivated the highest efficiency in its factories at home.

Thus, has come the era of the trade and continuation school in our own country. While the larger manufacturer of necessity has established his own trade school, the educators with characteristic American enterprise, have elaborated vocational training into a fixed and indispensable institution.

But, while vocational training as exemplified in thousands of American schools, has demonstrated its utility to a greater or lesser degree, it is not as yet accepted with the unanimity that it deserves.

The main reason here, perhaps, is that it constitutes a somewhat expensive branch of the popular system of education. Besides, the disgruntled taxpayer is inclined to hold that the schools have assumed a task which properly belongs to the factory. Why train a boy at public expense in order that the manufacturer may eliminate the apprentice system?

The large cost is in part occasioned by the fact that vocational schools not only involve ample housing but also an elaborate equipment of tools and machinery and a specially trained teaching force. The instructor must possess both technical and cultural training.

The modern vocational school, however, is the outcome of an evolution in American industrial life, and is here to stay. Its future stability will depend upon its adaptation to local industrial needs and upon the general efficiency manifested by those in charge of the schools.

The mere assurance that the vocational school fills a place in our modern economic life and that its product may serve a definite purpose, will not meet the situation adequately. The complacency which instructors, who are well paid and not overburdened with responsibility, sometimes affect will not be conducive either to the best results or that continued support which comes as the result of public approval.

The modern vocational school is as yet a young institution. It must demonstrate its utility and service in a maximum degree, not only to an immediate industrial constituency but to the general public as well, in order that it may command a sustained and reasonably liberal support in the future.

IRA S. GRIFFITH

Mr. Griffith's place in the respect and affections of those who knew him well cannot be filled. He had the charm of personality, the strength of character, the sincerity of purpose, and the beauty of life that marked him as a man of rare quality.

Abundant and rich contributions to the field of industrial education cannot compensate for the loss of this strong and wise leader. He lived and wrote and wrought in this special field during its period of struggle, growth, and development. He never ceased to grow. He made a contribution in thought, enthusiasm, and investigation to every phase of the work. His work will last. His name will have a permanent place among those who have worthily and effectively served their fellow men.

CULTURE AND UTILITY

Let no one for a moment think that possession of high aims will prove a sufficient excuse for poor technic within the necessary ranges or that by repeating fine phrases and by making large gestures he can assure himself of an easy arrival at the culture. At the root of culture is the practice of excellence and the way thereto is painful and severe. It is for the teachers of industrial arts to help artificer and workman as well as poet and philosopher find the way to a true and genuine culture.—Frank P. Whitney, *Cleveland.*

Beauty is myriad in its manifestations; art deals with a dish or a dog house just as it does with a painted canvas, a carved statue or a cathedral. You cannot produce art by intensive use of picture galleries, public lectures, and art schools, if beauty is ruled out of common life and ugliness takes its place.—Ralph Adams Cram.

Building a "Two-Minute" Camping Trailer

Maurice J. Archbold, Teacher of Electricity, Englewood High School, Chicago, Illinois

HOW shall I spend my summer vacation? This is always a big question and a hard one for every teacher to answer, not because there are not many things one would like to do, or many places one would like to visit, but because it is a long vacation without pay. The teacher with a large family must plan a vacation that will yield the greatest pleasure and real good for the smallest expenditure of money.

The close confinement of the schoolroom is making "outdoor-fans" of many teachers. Of the many ways one may spend his leisure out-of-doors and enjoy real fun, auto-gypsying is gaining more favor than any other outdoor sport. The writer and his family are among the many converts. A family of six, father, mother, daughter 15 years of age, and three sons ages 13, 10, and 6 years, we have found a vacation auto trip an expensive luxury except as a camping trip.

We have tried living in tents and also going to the same summer cottage at an inland lake every year. Neither of these has satisfied the entire family.

The lure of the outdoors calls for new places and new scenes every year. Stopping at hotels not only takes a very fat pocket-book for a family of six, but more than half of the fun of touring is lost. Often one wants to stop at a beautiful spot and enjoy scenery which may be

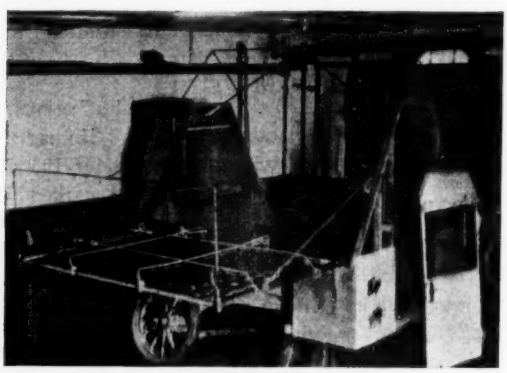


FIG. 1. UNDER CONSTRUCTION. BEDS OPENED OUT: RIDGE AND EAVES RODS IN PLACE READY FOR THE CANVAS.

far from hotel accommodations. The only way to do this is to carry your own sleeping quarters, cooking equipment and supplies with you.

This is done by the "auto gipsy" in many ways. The method most used is to pack the front, back and both sides of the automobile with all sorts of equipment, tents, poles, cupboards, etc. This method means an hour at least every evening devoted to setting up a tent camp and an hour every morning to breaking camp and packing. This task soon becomes so irksome as to interfere seriously with the pleasure of the trip.

The bungalow body fitted to an auto truck chassis furnishes excellent quarters for touring, but requires too large an expenditure of money for the few weeks it is used. The bungalow body may be fitted to one's own touring car, but it is rather a big task to remove the touring body and set the bungalow body in its place. The task is so great that one would hesitate to make the change for a week end trip. The semi-trailer and tractor is also an excellent way to tour, but the expense of keeping two cars, one for city driving and one for camping, and the cost of storage space for idle months is no small item. For us the camping trailer seemed to be the ideal way to tour, because in one minute the trailer can be hitched behind the auto and be ready for a week-end trip or a summer tour.

We needed sleeping quarters for six people, a place to cook and eat, as well as space to carry all our camping equipment and rations. As we wanted to get away from the job of setting up and taking down tents, it was necessary to construct a large outfit that would fold quickly into a small space.

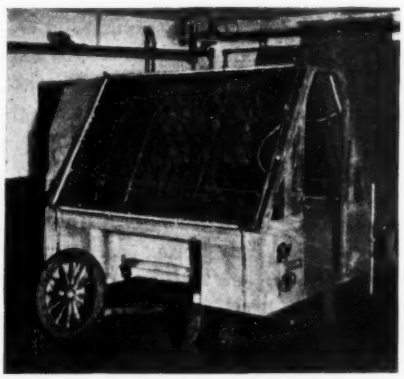


FIG. 2. UNDER CONSTRUCTION. BEDS FOLDED UP.

The body of the trailer was made seven feet long and six feet, four inches wide. This made the width about the same as the distance from fender to fender on automobiles and eight inches longer than a full length bed. To economize space a kitchenette, or cupboard was built on the front, opening into the body of the trailer. This provided ample space for cooking utensils, dishes, and rations. The cupboard-top was used as a kitchen table and also furnished space for our two burner "Kamp Kook" gasoline stove. Twenty-four inches directly above the stove was placed a sheet iron shelf which served as a warming oven and also protected the canvas from the heat. The kitchenette was made sixteen inches long and forty-eight inches wide. This made the total length of the trailer eight feet, four inches.

To be able to travel over all kinds of roads it was necessary to keep the wheel width, or tread, standard. This limited the width of the floor space to 48 inches, and allowed a space four feet by seven feet to be used as a living room and dining room. As this space was not large enough to accommodate camp stools or chairs, and because we were in need of seating space the body was built out in front and rear of the wheels to a width of fourteen inches on each side. This made a locker on each corner fourteen inches wide and twenty inches long; by covering the wheel space we had a bench on either side fourteen inches wide, seven feet long and eighteen inches high. One of these lockers was used as an ice box, the other three were used to carry extra blankets and clothes.

We used a folding table as a dining table at meal times and as a library table at other times. This then made three complete rooms: kitchenette, dining room,

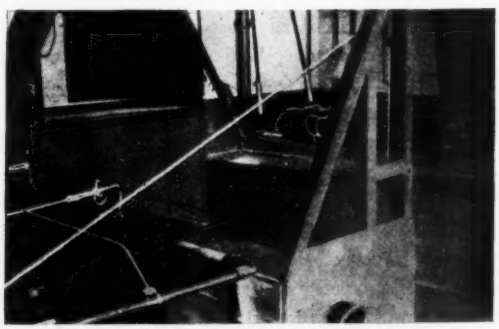


FIG. 3. INTERIOR VIEW SHOWING KITCHENETTE AND BENCHES.

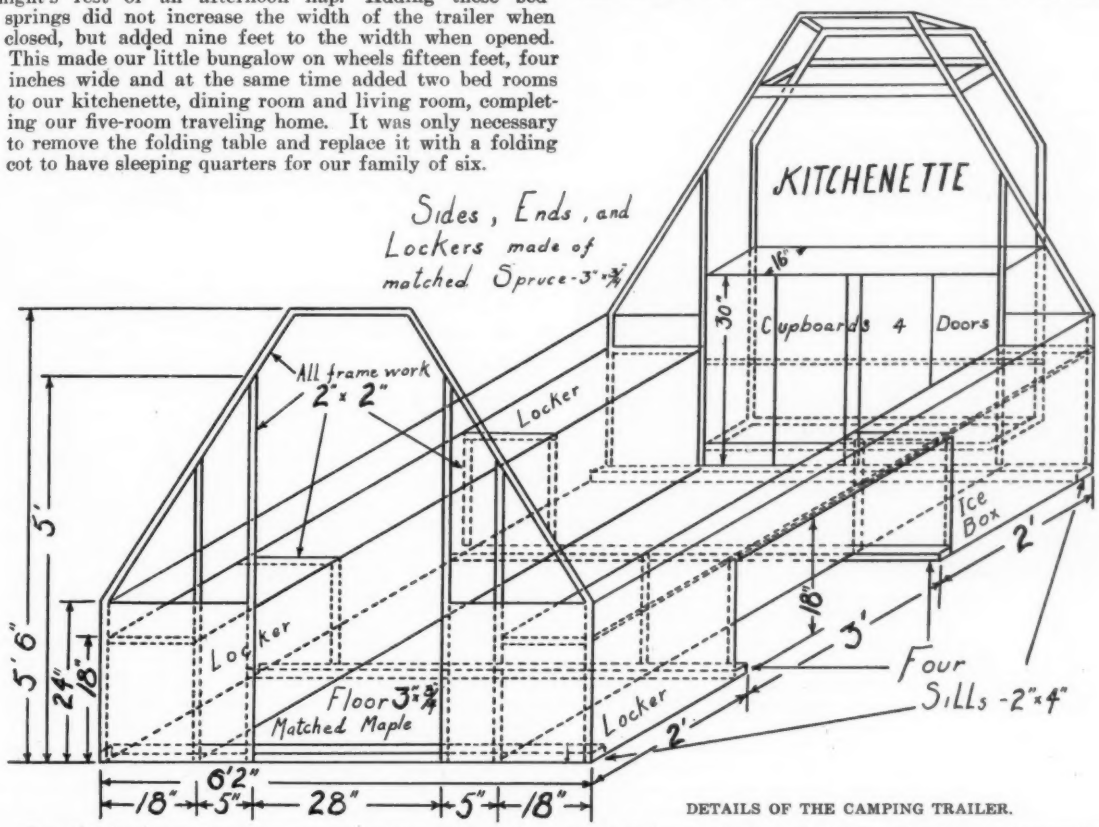
and living room, but we were still in need of sleeping quarters for six people.

Did you ever try hiking or riding all day and then sleeping at night on the ground or a hard bed? We have tried it. And did you feel much refreshed the next morning? We didn't, and for that reason we decided that our sleeping quarters should have good springs and mattresses as we wanted to sleep and rest as comfortably as we do at home. We secured two full-size bed springs four and one-half feet wide and six feet, two inches, long, of good quality, also good mattresses. These were mounted on frames made of three-quarter inch galvanized iron pipe, and were hinged to the sides of the trailer frame work. After our beds were made in the morning, bedding and mattresses were tied to the springs where they remained, whether open or folded, always ready, so that we had only to throw back the blankets and crawl in for a comfortable night's rest or an afternoon nap. Adding these bed springs did not increase the width of the trailer when closed, but added nine feet to the width when opened. This made our little bungalow on wheels fifteen feet, four inches wide and at the same time added two bed rooms to our kitchenette, dining room and living room, completing our five-room traveling home. It was only necessary to remove the folding table and replace it with a folding cot to have sleeping quarters for our family of six.

Ford parts were selected for wheel and wheel bearings, springs and spring perches, because Ford service stations can be found in every small hamlet in any part of the country.

To construct the spring suspension was our next problem. For the rear we used a standard Ford perch and spring shackle. As the front anchor must be made rigid, we secured two old style Ford perches that provided for spring suspension and wishbone anchor. On either side of this perch was bolted a piece of flat steel ¼ inch by 2¼ inches by 3 inches long. Three holes were drilled in each piece. This allowed a bolt through the wishbone anchor hole and one through the spring suspension hole. A shackle bolt was made for the third. This made a rigid front suspension.

For the hitch or tongue one and one-half inch galvanized iron pipe was used. Two braces were made, using



DETAILS OF THE CAMPING TRAILER.

Our folding bungalow was now complete, with cooking and sleeping quarters provided for, but we were in need of electric light. This was accomplished by wiring the interior with automobile lamps of the same voltage as that used on our car and connecting them to the battery on the car. A tail-lamp and stop-light also were connected up. The next problem was to build and mount an axle, at the same time keeping the center of gravity as low as possible. Two light wagon-axle stubs were procured and the spindles turned for Ford front wheel bearings, one threaded right and the other left handed. To keep the body low and have the same road clearance as a Ford differential housing, a drop axle was used. The stubs were hammer-welded to steel wagon axles one and one-quarter inches square, then formed as shown in the accompanying picture and welded together to keep the tread standard. It will be noticed that this drop axle permits the floor of the trailer body to swing lower than the center of the axle spindles. This allows of easy entrance from the ground without the aid of steps; it also keeps the center of gravity low.

one inch by one inch angle iron. These were fastened to the side of the trailer body, 36 inches from the floor, and to the tongue just back of the ball-and-socket joint used to connect the trailer to the car. The ball-and-socket uni-

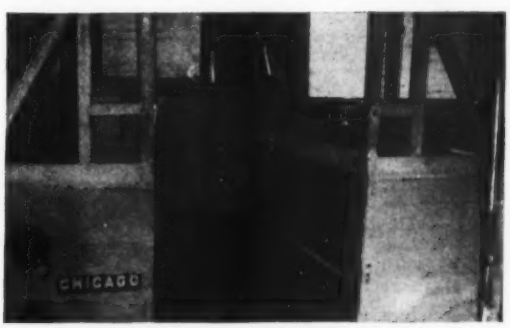


FIG. 4. INTERIOR VIEW SHOWING KITCHENETTE AND BENCHES. NOTICE THE LARGE FLOOR SPACE.

versal joint coupling was used in preference to other types of couplings because it makes the trailer ride, draw and track so easily and well that passengers in the car need never know that it is attached to the car. The triangle brace mentioned above eliminates side-lash of the trailer over rough roads or at high speeds.

FIG. 5. DROP AXLE AND SPRING SUSPENSION.

The trailer upon completion was used on a two weeks' camping trip from Chicago through Indiana, Ohio, and back to Chicago. When loaded with bedding, extra clothing, cooking utensils and rations, and ready for the road the outfit weighed 1400 pounds. All our baggage was carried in the trailer so that the touring car was as free of luggage as if we were out for an evening spin over city boulevards.

Our trip took us through the inland lake region of northern Indiana and along the Wabash River Valley, and our trailer bungalow pulled up and down hills without the least difficulty. Along level roads we traveled as fast

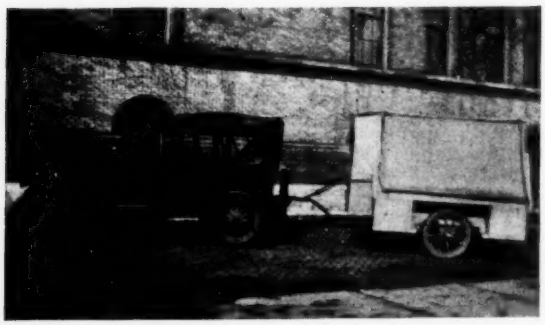


FIG. 6. FOLDED INTO A SMALL COMPACT OUTFIT READY FOR THE ROAD.

as we would have traveled without it. We found it no handicap, averaging as many miles per hour and as many per day as we would have averaged without it. Our maximum speed at any time was forty miles per hour, but we could have easily made fifty or more.

We were often asked what difficulties we encountered with our outfit on the road. Here are some of the remarks and questions. "Say brother, that's a pretty nice outfit, but how do you get it up hills?" "Doesn't it pull the back of your car off the road?" "That's a nice outfit, but isn't your road speed limited?" "Can you go faster than fifteen miles per hour?" "OH! Look at the house!

FIG. 7. A CLOSEUP. READY FOR A MEAL OR A NIGHT'S STOP. IT WILL BE NOTICED THAT THE TRAILER FLOOR IS LOWER THAN THE CENTER OF THE WHEEL. THIS ALLOWS EASY ENTRANCE FROM THE GROUND WITHOUT THE AID OF STEPS.

FIG. 8. A ONE-NIGHT STOP.

How do you pull it?" And many more along the same line of thought. We always had the same answer. "We can go anywhere you can and believe we can go as fast." To prove that we could go as fast we passed many touring parties that were traveling thirty miles per hour or better over gravel roads.

At every camp ground we were surrounded by other "auto gypsies" and invariably were asked the same question. "May we inspect your two minute cottage?" The name "two minute cottage" is not a misnomer for in less than two minutes we have our trailer opened out into a four-room and kitchenette bungalow, and ready for visitors or supper or both.

While camping at Blue Lake, Indiana, we drew the trailer along side of my brother's cottage, dropped the legs provided at each corner and unhitched it from the car. All this took about two minutes. We now had our bungalow stationary, and our touring car free for sightseeing side trips, and for trips to town for supplies. We stayed at Blue Lake camp five days and made a number of short tours. We visited Tri-Lakes, Shriner, Little Cedar, Round and Everett Lakes and on returning to camp we always found our little home on two wheels as inviting and comfortable as the others found their permanent cottages.

We had this advantage over our host. He must attend to many details in and about his permanent cottage before leaving it, while we take ours with us in two minutes. Folding our bungalow into a small compact trailer we become "Auto-gypsies" on our way hunting new scenes and visiting new places.

OMAHA'S POPULAR SCHOOL EXHIBIT

—The schools of Omaha staged an exhibit in one of the local department stores which commanded unusual attention. The newspapers came out with first page descriptions and gave great impetus to a popular interest in the work presented.

The editorial of a leading daily comes out with this enthusiastic comment: "If you get up in the morning with a bad taste in your mouth, damn the weather, are afflicted with that dismal feeling and despair of the future of the republic—then go take a look at the exhibition of the work of the Omaha public schools, on view at the Brandeis stores.

"The result will be surprising. You will throw away your crutches and step off with the lithe vigor of youth. If you still despair it will be of yesterday and today—but not of tomorrow. For tomorrow, as you will plainly see, is to be in the hands of our betters.

"We hear a great deal of nonsense nowadays about how the children are deteriorating together with their elders. But nonsense is all that it is. For the children are coming whooping along under a full head of steam, better trained, better equipped to become good citizens, with their imaginative and creative faculties more highly developed, than were we and ours when we were children."

"We hear much about the high cost of education," said John M. Matzer, state superintendent of instruction, "but an exposition like this shows that we cannot evaluate the service of the schools in dollars and cents. It is a wonderful showing. It is a monument to the instructional system of the Omaha schools."

The exhibits are the work of the pupils from the kindergarten to the high schools, covering every phase of classroom effort, capable of lending themselves to demonstration.

Auto Mechanics in the High School: Can We Justify It?

Lewis H. Wood, Sioux City, Iowa

Twenty years ago the chief aim of the high school seemed to be to prepare boys and girls for college and university entrance. Today, while still doing this for those who can spend a longer time at their education, the high school is really trying to prepare its boys and girls for life. Twenty years ago the high school which offered a course in wood shop or mechanical drawing was doing as much or more than the majority of schools in providing handwork for its boys. Today a high school that does not give at least a year's work in wood shop and mechanical drawing is hard to find. Twenty years ago manual training was tolerated provided a corner could be found in the basement or attic of the schoolhouse. Today, developed into vocational training, it not only has a large part in the high school but frequently is a controlling factor in the school.

Practically all lines of work followed by large groups of people have been suggested as possible and desirable additions to school vocational training. Many of them have been introduced with excellent results and doubtless many more will find their places as we adapt the school more and more to our boys and girls. One of the latest additions has been the study of the automobile, or automobile mechanics as it is usually called. While this work is spreading quite rapidly in our schools, yet there is quite a little question as to its being justifiable when so few of our boys, especially high school boys, will ever become garage mechanics. This discussion is an attempt to show how the study of auto mechanics in our schools functions in the everyday life of the boy and the community and is therefore justified.

Nearly everyone agrees that there is a place for woodwork in our schools because it not only allows the pupils to express their ideas in concrete form, but because practically everyone, especially householders, need to know a little about the use of the more common woodworking tools. No one can ever estimate the amount of help our school manual training shops have been to the home owners of today. Today the automobile has become a component part of most homes, while the boy in the home may never become a garage mechanic, yet the ability to care for the family car is becoming if anything more important than the ability to use common tools about the home. How much worry, trouble, and expense can be saved if one knows something about a machine, how it is built, what the various parts do, how they operate, their relation to other parts, and where to look for and how to take care of the more ordinary troubles. All of this and more can be taught in an auto mechanics class in our high school.

As the school wood shop gives a general introduction to all the wood working trades so the auto shop gives some insight into most of the common metal working trades. In our wood shops the boys have learned to use the common tools of the wood worker. In the auto shop some of the more common tools of the iron worker, the tinner, the plumber, and the electrician are used, and as a result the boy's general knowledge is much enlarged. Where previously, after a course in the wood shop, the boy was able to do more or less in the upkeep of the wood work in the home, he may now be able to do almost anything from soldering a leaky pan to fixing up electrical troubles. In fact a year in the wood shop and a year in the auto shop will equip nearly any boy with enough practical knowledge so that he will be able to care for most of the small repairs necessary about a home.

There will always be square pegs trying to fit themselves into round holes because they never had a chance to find out that they did not fit until it was too late. As we enlarge the opportunity for tryouts in our schools we can reduce the number of misfits in the world and so add to the peace and harmony of mankind. Our auto shops give the boy this chance to see if mechanical work appeals to him and if he has sufficient skill to become successful in such work. With all of our various school activities we may not find the proper hole for our square peg, but we at least can eliminate a few of the round holes into which he might have tried to fit himself.

Government reports show that on an average not over one-third of the children entering high school ever graduate and of those graduating only about one-third go on to college or higher education. This means that over 90 per cent must face the world with not more than a high school education. For these our shops and particularly our auto shops have a very distinct vocational value. If our courses are flexible, and designed, as they should be, for the boy rather than the subject, the boy who finds that he must go to work and has developed an interest in mechanics may spend more of his time in the shop and specialize along some line of shop work. For him the auto shop may be a pre-trade course in any one of many lines. A one year's course may not take him far but it will give him a start. If he can stay two or three years he should be able to go out well trained in his trade.

Of course to be of the most value our shops should be so organized that it is possible for over-age boys not yet in the high school to have its advantages. Many of these boys are mechanically inclined and are apt to go to work in garages or follow other mechanical pursuits. If the opportunity to spend an hour or more a day in the auto shop will keep these boys in school a little longer, and then send them out with a good start toward a trade, is the work not justified? The average mechanic has learned his trade largely by experimenting on our cars, much to their detriment, and by changing jobs frequently. In our school shops these over-age boys, from whom many of our future mechanics may come, will make a systematic study of the automobile which should give them a different attitude toward car work. They will learn much about a car, and they will have been taught to do a job right so that they are likely to be more careful when they go out into commercial work.

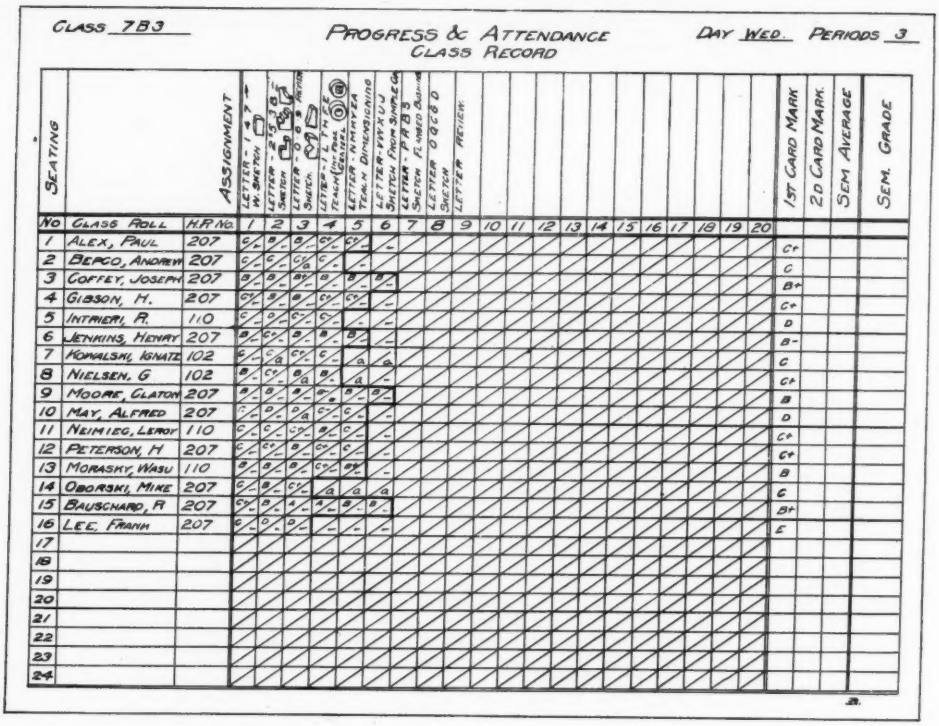
In this day of a seeming great distaste for labor, especially if it involves the wearing of old clothes and getting into the dirt, one of our greatest problems is to try to give our boys a respect for honest toil. The auto shop perhaps more than any other school shop makes this possible. In this shop the boys must wear overalls; they must get themselves and their clothes greasy and dirty; they must get down on their backs under a car while dirt and grease drip down on them, and they must *all* do it. There can be no distinctions in school. All must do the dirty work as well as the clean and this spirit of democracy and equality fostered by the work in the shop will do much to make our boys useful men in the years to come.

A shop course that will do so much for the boy both in a general and a specific way is much to be desired in any school. It makes no difference whether our school is a vocational school, a large city high school or a country high school the work is just as applicable for the automobile has penetrated to every corner of our country and has become common to the rich and poor alike. In fact it could be said that the country high school really needs this work the most since its patrons are usually a long ways from help in case of trouble with their cars. These things point to the desirability of a much more general introduction of this line of work in our schools as a fully justified type of school-shop activity.

A NEW CLASS-PROGRESS AND ATTENDANCE RECORD

D. E. Kellogg, East High School, Erie, Pa.

The prevocational shop or drafting teacher finds a variety of desirable records that he wishes to keep concerning the individual members of the class. In many cases several forms are used when one would serve the purpose more efficiently. Consider the following items: attendance record book, progress record sheet, lesson plan sheet, and any other notations of class assignment.



CLASS 7B3 — PROGRESS & ATTENDANCE CLASS RECORD — DAY WED. PERIODS 3

SEATING		ASSIGNMENT	LETTER - 1 4 7 SHEETS	LETTER - 2 5 3 6 SHEETS	LETTER - 8 9 SHEETS	LETTER - I L T H E TRIANGLES, CIRCLES	LETTER - N A M V E A TRIAN DIMENSIONING	LETTER - V W X U J SHEETS FROM SIMPLES	LETTER - P R B 3 SHEETS FLOOR PLANS	LETTER O Q C 8 D SHEETS	LETTER REVIEW	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1ST CARD MARK	2D CARD MARK	SEM AVERAGE	SEM. GRADE
NO	CLASS ROLL	H.P. NO.																																
1	ALEX, PAUL	207	C/-	B/-	B/-	C+/-	C+/-	-																							C+			
2	BEPCO, ANDREW	207	C/-	C/-	C+/a	C/-	-	-																							C			
3	COFFEY, JOSEPH	207	B/-	B/-	B+/-	B/-	B/-	B/-																							B+			
4	GIBSON, H.	207	C+/-	B/-	B/-	C+/-	C+/-	-																							C+			
5	INTRIERI, R.	110	C/-	B/-	C+/-	C/-	-	-																							D			
6	JENKINS, HENRY	207	B/-	C+/-	B/-	B/-	B/-	-																							B-			
7	KOWALSKI, IGNATZ	102	C/-	C/a	C+/-	C/-	a	a																							C			
8	NIELSEN, G	102	B/-	C+/-	B/a	B/-	a	-																							C+			
9	MOORE, CLATON	207	B/-	B/-	B/-	B/-	B/-	B/-																							B			
10	MAY, ALFRED	207	C/-	B/-	B/a	C+/-	C/-	-																							D			
11	NEIMIEG, LEROY	110	C/-	C/-	C+/-	B/-	C/-	-																							C+			
12	PETERSON, H	207	C/-	C+/-	B/-	C+/-	C/-	-																							C+			
13	MORASHY, WASU	110	B/-	B/-	B/-	C+/-	C+/-	-																							B			
14	OBORSKI, MIKE	207	C/-	B/-	C+/-	a	a	a																							C			
15	BAUSCHARD, R	207	C+/-	B/-	B/-	B/-	B/-	B/-																							B+			
16	LEE, FRANK	207	C/-	B/-	B/-	-	-	-																							E			
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CLASS PROGRESS RECORD AND ATTENDANCE RECORD FORM.

The single card form submitted with this article aims to cover all the above mentioned points of information so there will be a minimum waste of time and energy.

Since the individual progress and class attendance are always in parallel lines, the spaces opposite the student's name are set aside for these records. The space assigned for each day is divided in half by the diagonal line. The portion at the left and above the line is to be used for rating each completed assignment. The space below and at the right of the line is for attendance only. The advantage of this arrangement is that one can readily determine why some students are behind with their assignments, since there are only three items that need be considered, attendance, application and ability.

The large rectangular spaces across the top of the form are for brief notations of class assignment and should check with a definitely outlined course of study. A check up of these assignments will determine the relative speed that one class makes in comparison with other classes of the same rated section. These assignments also show how much of the course of study has been completed by each member in any or all of the groups. By making the assignment at least one week ahead of the most advanced student of the group, no one is ever out of work; and after the first few weeks the instruction becomes almost entirely individual.

By keeping this record always exposed, the members of the class may examine it at will and determine their own relative standings. It acts as a stimulus to the slower student for he learns that he is master of his own grades and if he passes, it is on a merit basis only.

It makes an interesting study of relative advancement of the members of a class, if at the end of each card mark period, a heavy line is drawn vertically across the sheet directly after the last completed assignment of each student.

The record shown on the form submitted illustrates the points mentioned as a record at the end of a six-week card mark period for an average class in prevocational drafting practice.

HOW OREGON IS HONORING HER CRAFTSMEN.

A. R. Nichols, State Supervisor of Trades and Industries

The state of Oregon claims the distinction of being the first state in the Union to honor its skilled craftsmen by election to an honor society. As Phi Beta Kappa is the highest recognition to be attained in the scholastic world, the Guild of Building Handicrafts is the highest honor that can be won by an artisan in Oregon. The state, through its Department of Vocational Education, has placed a stamp of approval on this movement.

The lack of incentive offered to ambitious young men in the building trades has long been recognized in Oregon. A need for some higher standard of ideals among the crafts, whereby a master workman might be rewarded for work well done, was generally felt. To fill this need the Guild was organized. While it is modelled somewhat after the English "guilds" of the middle ages, its purpose is somewhat different. The first installation of the Guild took place in June, 1923, at a meeting of the Association of Building and Construction of Oregon, in Portland. Hon. J. A. Churchill, state superintendent of public instruction; Mr. Sam Kozer, secretary of state; Mayor George E. Baker of Portland; Mr. Stephen I. Miller, dean of the School of Commerce, University of Washington, members of the State Board of Vocational Education, and about 450 business and professional men were present.

The scene at which old-time master tradesmen stepped forward to receive their certificates of membership was one long to be remembered by those present. One white-haired old plasterer, 65 years of age, said, when he walked up to the table, "This is the proudest moment of my life. It is the first time in forty years that any person has even suggested that I was doing a good job. From now on I am going to take a greater pride in my work than ever."

Although the society was originally composed of craftsmen in Portland, it is now state-wide in its nature. From time to time the members plan to add persons from the state at large who have made a notable success of their work. Membership, like that of an honor fraternity, is by invitation only. Prospects do not know they are being considered, and a Guildsman becomes such only

after a very careful consideration and inquiry has been made as to his fitness to bear the title.

A gold button, bearing the inscription "Guild of Building Crafts," and a reproduction of the Oregon state seal, is presented by the state to the members which takes the place of the key of Phi Beta Kappa.

"A Guildsman should function as a leader in his craft, through example," read the rules for the guidance of members. "If a group of Guildsmen feel that they can be of help to other craftsmen who have not enjoyed either their experience or opportunities, they are at liberty to organize help in the form of classes or demonstration work if they so wish, but there is no obligation for them to do so.

"The object of the Guild shall be to foster the ambitious and creative impulses of the individual craftsman; to give opportunity for self-advancement and improvement in the several crafts; to encourage individuality, and to elevate the standard of craftsmanship for forming Guild of Handicrafts and by instituting educational facilities, and by establishing an apprenticeship system."

The state plays an important part in the guild program. The guild is recognized by the State Board of Vocational Education, and educational classes are already being conducted by the supervisor of trade and industrial education, among members of the guild who have expressed their willingness to teach. They in turn are enabled to impart their technical knowledge of handicrafts to the group of workmen next lower in the scale of efficiency, and so on.

Selection of 23 men as charter members of the guild has already had a marked effect upon the attractiveness of the building trades, particularly in Portland. The new honor has dignified the crafts, which was one of the primary purposes of the movement. It was recognized that unless some steps were taken to adjust the estimation in which most trades are held by most young men, that the supply of thorough and conscientious workmen in the six or seven most important construction trades would dwindle down to the danger point.

A significant factor in the guild movement of Oregon is that there is nothing in a financial way connected with it, either by membership or by its method of attracting apprentices and new blood into the trades. Although representatives of organized labor have been associated in the development of the scheme there has been no tendency to inject into the plan any consideration bearing on compensation, either of Guildsmen or the mass of other workmen which come in contact with the 23 honored.

As long as the ideal of the guild—to reward craftsmen on a basis of work well done—is held up before workmen, and as long as membership remains by invitation only, the great body of craftsmen cannot help but put new life into their work, and strive to emulate those who have been honored.

As in the old English guilds, there are three degrees in the Oregon society—Master Guildsman, Journeyman Guildsman, and Apprentice Guildsman. Any worker in any craft, engaged in the building industry in Oregon, is eligible for election to membership.

Realizing that it is impossible to get in touch with the thousands of skilled workmen through the state, the guild has invited the cooperation of leading artisans in the state. When they hear of a craftsman worthy, in their opinion, of guild membership, they are asked to submit his name on an application blank. Five sponsors are required before the application can be considered. All recommendations for membership must be accompanied by photographs of the work of the candidate or other exhibits and are passed on by a jury of five men who are workers in the same craft as the man being considered. This examining jury may call for further evidence, and may examine witnesses if they so desire. An affirmative vote of two-thirds of the members is necessary to elect.

The State of Oregon believes that it is the only state in the Union at present that is paying such attention to its craftsmen. While the guild system may be new in its application in the state, it is based on a principle as old as the hills—that a trade is as honorable as its ideals, and that honor should be given for work well done. It plans to offer facilities for keeping these ideals before its workmen, through education and self-advancement, to make opportunities for self-expression, to bring out individuality, and to create and keep a high standard of workmanship among the craftsmen in all branches of the building trades, and to prescribe and enforce all reasonable rules in furthering these motives.

Carpenters outnumbered other trades among the names of those selected as original members. The nine honored were S. E. Darling, Samuel Farquhar, George S. Gruber, E. R. Long, Alexander M. Shand, Seth Lind, Ray Weld, William Weckner, and W. A. Weaver. Other members include Alfred Reed, carpenter finisher; Oliver Brunkow, cabinet maker; W. G. Gray, Louis Schubert, modelers; W. R. Thompson, plasterer; Louis L. Gluch, F. Frauendorf, N. T. Nelson, painters; E. J. Miller, J. Morrow, plumbers; F. L. Calouri, V. H. Haybarker, George Pettingill, electricians, James L. Dorney, brick mason.

USABLE MECHANICAL DRAWING

H. C. Thayer, Menomonie, Wis.

In the continuous process of evolution affecting the various subjects grouped under the general heading of the manual arts, those changes in mechanical drawing are perhaps least noticeable. In the beginning manual training was almost invariably woodwork. That has given way to a number of quite varied shop activities, and today we see the tendency toward making the single-shop activity a composite under the name of general shop or home mechanics. The general shop meets the need for a place where the pupil can try out for himself the various forms of shop activity and is built upon the assumption that later on the pupil will specialize in one or more lines found preferable. On the other hand home mechanics is based upon the idea that the pupil will only take a limited amount of shop work and that it would be better if that work were specifically directed toward the problems found in the modern home, in the cycle of affairs that the average non-technical citizen will be called upon to follow.

While these changes have been making themselves felt in the shopwork there has been no corresponding development in drawing. For the most part projection in its various phases still remains the only objective. There is a field for the drawing teacher as yet entirely undeveloped, in which he can do for the work in drawing exactly what home mechanics has done for the shop work. The business man, the professional man, and the woman in business as well as in the home will be called upon at times to read drawings. While some of those drawings may be based upon projection the greater part of them will not; but instead they will be of statistical charts and graphs, layouts of store or office fixtures, plats of lots with the adjoining streets and alleys, curb and gutter lines, sewers, water, gas and electric lines. They will include architectural drawings of different kinds and degrees of difficulty for both new work and in connection with remodeling; the systems of symbols which may be employed to represent types of windows and other construction, gas, electric, and water outlets together with relationships which exist among sections, details, floor plans, elevations and perspectives. All these will need to be considered in such a course. There will also need to be studied simpler forms of topographical work, especially those commercial adaptations of the map maker's work so much used in business today.

In all these fields that have been indicated it is much more important that the pupil be given knowledge that will enable him to read and understand drawings than that an attempt be made to develop any great amount of skill in making such drawings. It is assumed that drawing is a language, and that as such it may be studied both through creation or execution, and through reading and comprehending; both phases of the work are important and both must enter into the instruction. Thus the pupil going out into the non-technical places is given a reading knowledge, an understanding of that form of expression so universally used today, the language of graphic representation.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

A JOB SHEET IN CONCRETE FOR HOME MECHANICS

F. E. Tustison, Menomonie, Wis.

It is generally understood that any work in concrete can not be carried on successfully in the home mechanics shop. The following job can be done nicely with a minimum amount of material and apparatus. One-half cup of cement and one cup of sand will make more than enough mixture to cast the block. The forms can be purchased at the Cruver Manufacturing Company, Jackson Boulevard, Chicago, Illinois. Different forms than those described in the job sheet can also be obtained. The job is outlined in order to give the boy a general knowledge of what is done in concrete work.

JOB SPECIFICATIONS: To make some concrete blocks (dry mix).

Cement is a very useful material. The demand for it is increasing every year. It is the main constituent in concrete, the use of which is most universal. When cement and sand are mixed together, it is called concrete. Gravel and crushed stone are sometimes added to the concrete when it is used for heavy work. Foundations, whole buildings, walks, roads, piers, and bridges are often built of concrete. It is also used to make smaller articles such as garden furniture, flower boxes, bricks, tiles, pottery, and vases. Wherever it is used, the method of making is the same.

MATERIAL: One-half measure of cement, one measure of sand, and water.

TOOLS: Metal mortar box, metal mold for block 1"x1"x 1", metal mold for block 1"x1"x3", metal plate, tamper, and piece of tin.

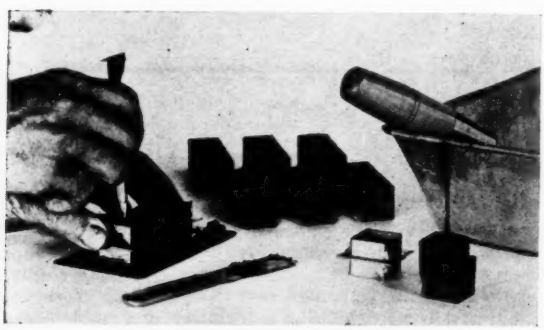
PROCEDURE:

(1) Mix the cement and sand.

A good strong mixture is one part of cement to two parts of sand. The mixture may run one part of cement with even five parts of sand. Measure your 1:2 mixture carefully and mix thoroughly while dry.

(2) Add water.

Add just enough water to make the mixture about as moist as wet sand. Avoid too much water; for if the mixture is too wet it will stick to the mold. This process is called the "dry mix."



CASTING A CONCRETE BLOCK.

(3) Tamp the blocks.

Place the 3" mold on the metal plate and partially fill with mixture. Tamp it down hard with the steel tamper. Use the small end to tamp into the corners and around the edge. Remember the harder you tamp the stronger the block will be. Finish off the top smooth.

(4) Remove the mold.

After the block is tamped, it can be immediately removed from the mold. Turn block upside down on the piece of tin. Pull off braces and gently remove the mold. Do not handle the block.

(5) Make two more blocks.

Make two more blocks in like manner placing them on the piece of tin with the first block.

(6) Reinforce a block.

The principles of reinforcing concrete should be learned by every boy because it is reinforcing that makes concrete strong and practical under heavy loads. Cut light wires to length about ½" shorter than the block to be made. Tamp concrete in bottom of mold about ⅛" deep. Place two or three wires about ¼" apart and ¼" from the end of the mold. Fill up mold and tamp hard again to about ⅛" from the top and put in wires the same as bottom. Cover with concrete and tamp hard and finish as usual. Place reinforced block on the metal plate with the others.

(7) Make a colored block.

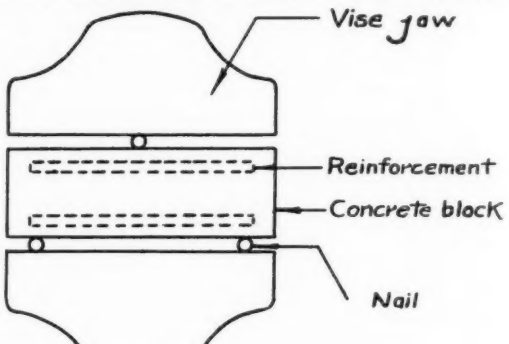
Artistic and ornamental effects can be produced by colored cement blocks. This can be done by mixing coloring material with the cement just as the big contractor does on a cement house. Mix ½ teaspoon of coloring material, one teaspoon of cement, and two teaspoons of white sand and wet as before. Cast the small one inch cube and place block with the others.

(8) Cure the blocks.

The process of making cement blocks harder and stronger is called curing. Allow blocks to set over night. To cure blocks, dip them in water a few minutes every day for three or four days. The chemical action of the water will make them hard as stone. Do not cure one of the blocks and test difference in strength after one week of curing.

(9) Test the blocks.

Rub a cured and the uncured block together and note the difference in hardness. Clamp the reinforced block in



TESTING BLOCK FOR STRENGTH.

the vise as per diagram and turn up the screw until the block starts to break. Test block that was not reinforced likewise, noting the difference in strength.

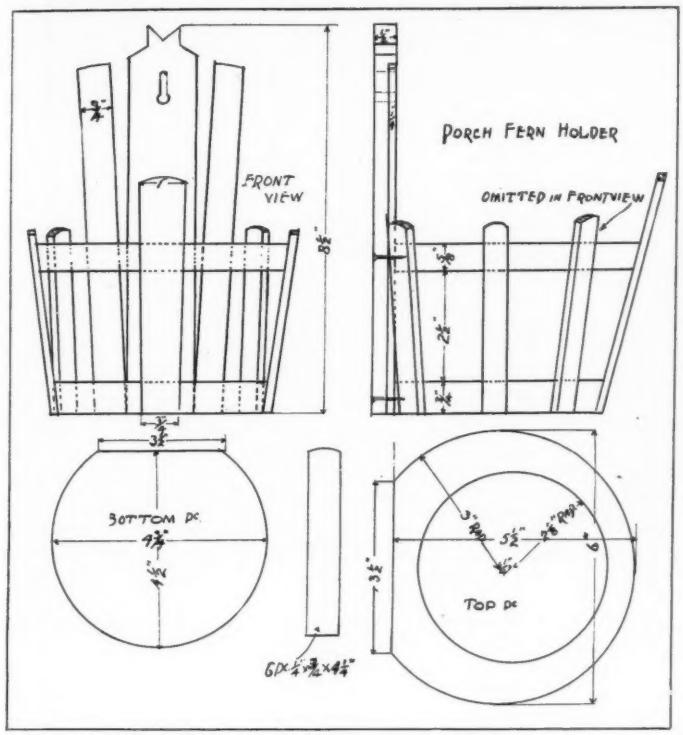
QUESTIONS:

(1) What is concrete?
(2) What is the use of added water?
(3) Why is it necessary to cure concrete properly?
(4) What is the result of not curing concrete properly?
(5) What is meant by a 1:3 mixture?
(6) Why mix concrete so thoroughly?
(7) Where is reinforced concrete used?
(8) What are the different concrete mixes?

Reference: Wood & Smith, Prevocational and Industrial Arts, pp. 191-192.

RECORD:

Name..... Class.....
Date begun..... Date finished.....
Can you answer all of the questions?.....
Instructor's Grade.....



DETAILS OF A PORCH FERN HOLDER.

A PORCH FERN HOLDER

J. R. Holliday, Richmond, Va.

We have all observed, more or less, the special interest that boys take in projects of the constructive type. The accompanying drawing is one of a porch fern holder designed to stimulate this instinct of constructiveness so prominent in boys of the elementary school, and also to utilize waste material.

The dimensions are those suitable for a flower pot of 4" diameter at the top. The bottom and top pieces are worked out first, while the bevels and the circle cut-out are done after the job has been assembled. Before assembling, the top should be bored from both sides with a No. 8 bit at circle cut-out line to start the cutting with the keyhole saw.

The back is attached to the top and bottom pieces with 1" or ¾" brads.

Having attached the three pieces at the back and one on each side, next bevel top and bottom pieces at the edges. Test with the straight edge of one of the pieces until it touches the tops of both pieces. Nail on the front piece in the center. Divide each half into three equal parts, and nail on the remaining pieces. Next cut out the circle with keyhole saw neatly to line. By leaving this operation to the last the top is kept intact; otherwise it would split when nailing.

The job may be finished in white. To make it more attractive it may be finished in different colors, and hung beside the entrance door in the porch.

DUST PAN

L. F. Hyatt, Instructor of Sheet Metal Work, McKinley High School, Canton, Ohio

The dust pan, which may be made of I X bright tin or of a light weight galvanized iron, is a project suitable for eighth or ninth-grade boys. The pan is exceptionally durable, and the construction is simple. The wire which is used in the making of the pan adds very greatly to its strength.

The first operation after the metal has been carefully cut according to (Fig. 2) is to bend the edges *a*, *b*, and *c* on the bar folder to receive a No. 14 coppered wire which is equal in length to the edges *a*, *b*, and *c*.

Second operation: the wire is secured in the edge *a* on the wiring machine, allowing the ends to extend out the length of *b* and *c*.

Third operation: the bends are made on lines *d* and *e* on the cornice brake, being careful to do it accurately.

FIGURE 1.

Fourth operation: the wire which was put in edge *a* must be bent at right angles with edge *a* for the purpose of fastening it in edges *b* and *c*.

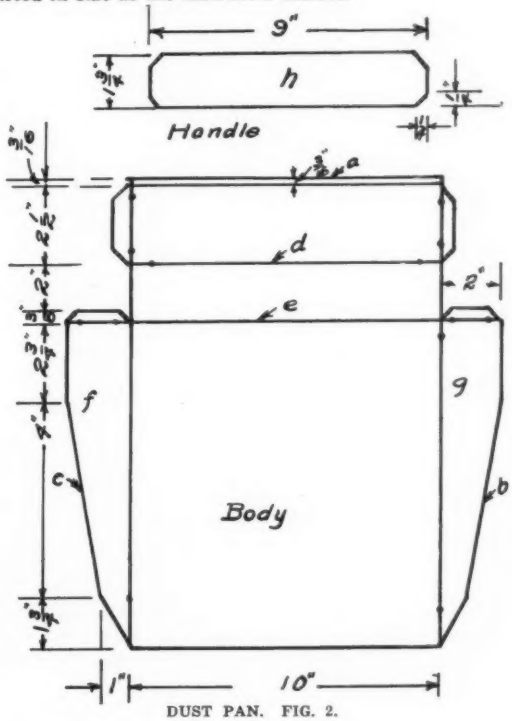
Fifth operation: The ends *f* and *g* can be bent on the right and left sides respectively of the cornice brake.

Sixth operation: the wire is then inserted in the edges *b* and *c* and fastened there on the wiring machine.

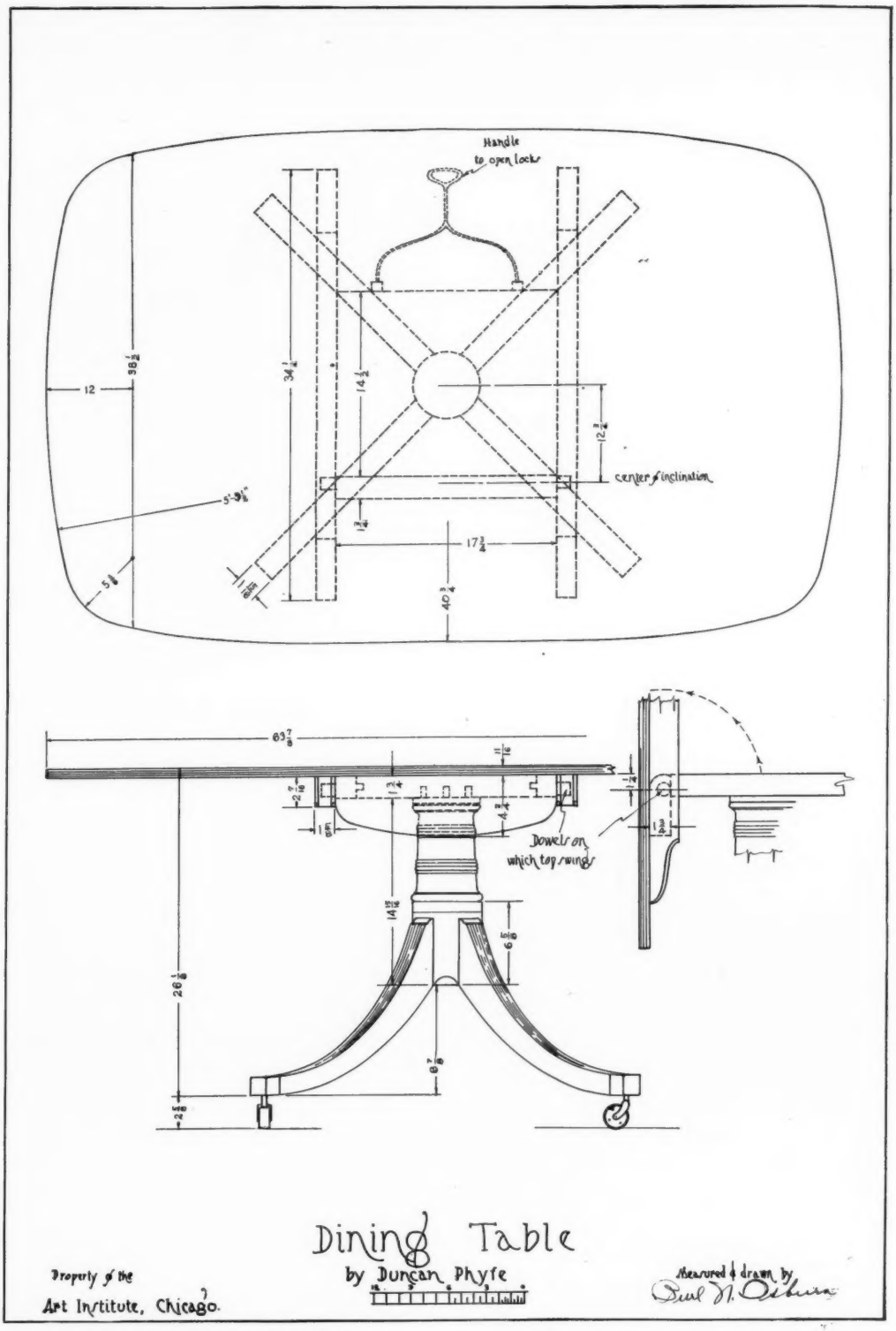
Seventh operation: the allowances for the lap seam are then soldered.

Eighth operation: the handle is then cut as shown in (Fig. 2) and a double hemmed edge folded on the bar folder. The bends are made, after which it is soldered and riveted in place as shown in (Fig. 1).

This pan is suitable for home or school use and may be varied in size as the instructor desires.



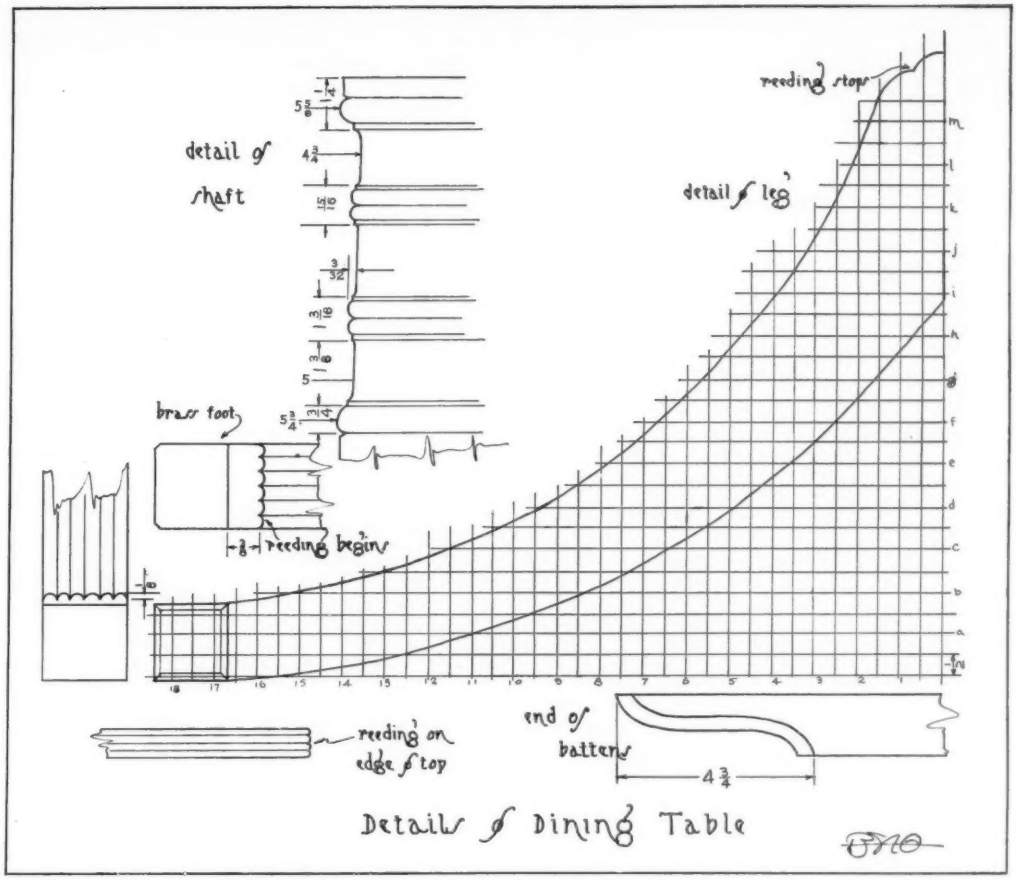
DUST PAN. FIG. 2.



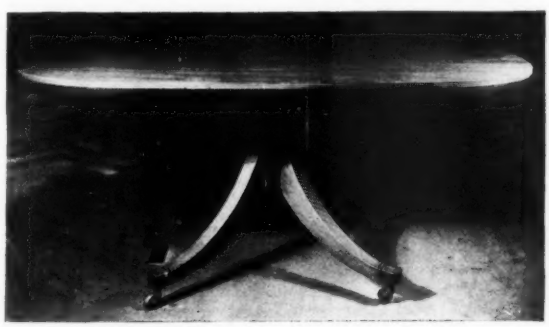
A DUNCAN PHYFE DINING TABLE

Burl N. Osburn, Sioux City, Ia.

A general description of the furniture of Duncan Phyfe is not necessary to the readers of this Magazine. One will find in this table his essential characteristics of grace, strength, and delicate refinement. Its construction is rather unusual for a table of its size in that the top tips to a vertical position. The top is held in a horizontal position by means of a pair of locks, similar to cupboard locks, that are fastened against the top and operate simultaneously by an iron handle. On top of the shaft is fastened a horizontal cap, strengthened on each side by tongue and groove battens. At one end of this cap is fastened a curved vertical piece having dowels cut on each end. Bat-



DETAILS OF SHAFT AND LEG OF PHYFE DINING TABLE.



THE TABLE IN A GALLERY OF THE ART INSTITUTE IS DIFFICULT TO PHOTOGRAPH.

tens fastened to the under side of the top swing on these dowels. The axis or center of inclination can be determined from the drawing. The ends of these battens are curved and champfered. The legs are reeded on the upper side and end in brass feet fitted with casters. The table is made of rich-colored mahogany, finished in what is probably the natural color, with dull-rubbed varnish.

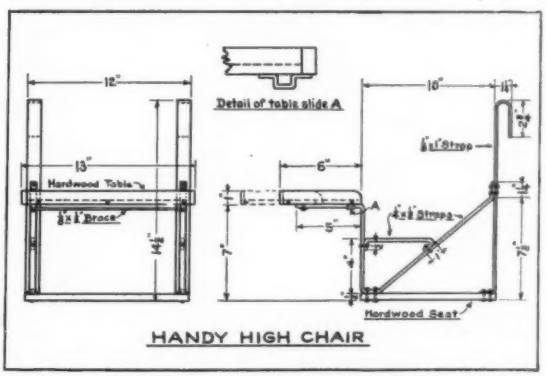
PIANO FOOT REST

Howard G. Olivit, East Technical High School, Cleveland, Ohio

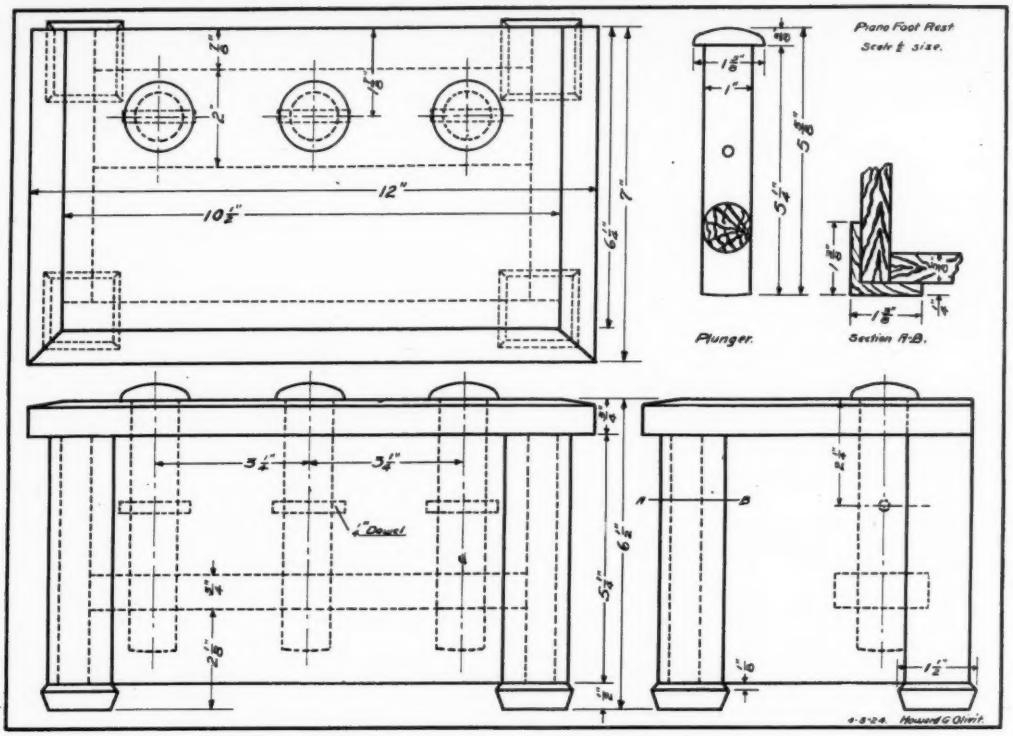
Here is a problem that will be welcomed by teachers of cabinet making, who are forever on the lookout for something to take the place of time-worn problems we all know so well. The writer has made and used this piece in his own home, when as little tots, his own children were taking piano lessons. He has loaned it to more than one fond mother, whose young hopeful was struggling with scales and finger exercises and the use of the pedals, when she was yet too small to reach them.

There are many different ways the foot rest may be made, and the judgment of the teacher, based on equipment, ability of the class, etc., should be the deciding factor as to the construction. I am submitting it just as I made it first, using butt joints, and disguising or covering them with corner pieces and the addition of the four feet.

On nearly all pianos, just above the pedals, and screwed to the front base piece, there is a piece of nickel plated metal, about one-half inch in diameter, and eleven inches long. It is for ornament only, and the foot rest may be constructed so as to rest against this piece, thereby eliminating the danger of scratching the piano. On pianos where this ornament is left off, two pieces of heavy



DETAILS OF A CHAIR OF METAL AND WOOD. DESIGNED BY EBER L. MOORE, CONNERSVILLE, IND.



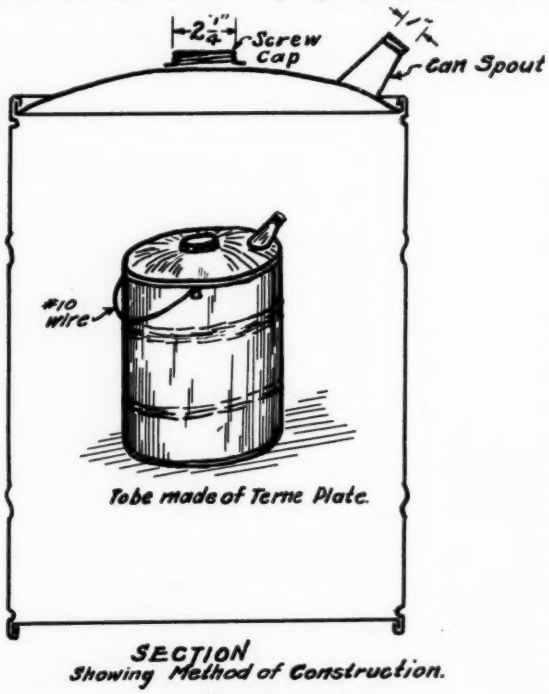
DETAILS OF A PIANO FOOT REST.

felt may be used, placed at a convenient height from the bottom, so as to function as described.

The dimensions given may vary for pianos of different makes. I would suggest measuring the centers of the pedals before making the foot rest.

The plungers should move very freely, and when in place should measure about seven-eighths of an inch from the top of the rest to the under side of the plunger head. From the under side of the plunger head, measure down two and one-fourth inches, and drill a one-fourth inch hole through the one inch diameter.

After assembling the plungers in the rest, place a one-fourth inch dowel, one and one-half inches long in the holes just bored. This serves to keep the plungers from being lost or removed. The spring connected with the pedals in the piano will keep the plungers at their proper height.



DETAILS OF AN OIL CAN.

AN OIL CAN

R. L. Welch, Stout Institute

This can will be found helpful for carrying oil or any other liquid. The illustration clearly shows the construction.

A LUMBER RACK

F. D. Davis, Continuation School, Racine, Wis.

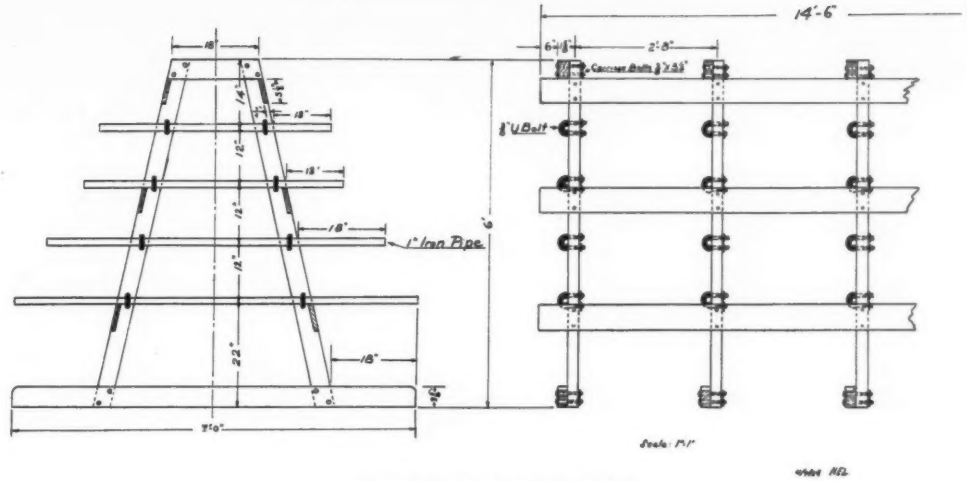
This rack is designed to take up a minimum amount of floor space and to accommodate the maximum board feet of lumber. Another feature of the plan is the accessibility. Lumber can be taken from each side and one end. The several compartments allow a variety of distributions of several kinds and sizes of lumber.

The floor space occupied is 98 square feet while the rack itself will hold from 5,500 to 6,000 board feet exclusive of lumber which can be piled on the top. As a suggestion this rack need not follow the above dimensions but can be constructed to fit individual or special wants.

A DOUBLE DOVETAIL JOINT

Sherman M. Turrill, Nash School, Chicago, Ill.

This is the strongest dovetail joint ever made and is a new method of fastening together your radio box, silver cabinet, cedar chest, glove box, handkerchief box, or anything that has the form of a box. This joint cannot possibly come apart in any direction. The glued blocks prevent this in the direction it was put together, and this is the only way it could be parted. With the rigidity of the bottom it cannot be loosened enough to rack, that is to change its shape. It is as firm and rigid as the solid material and without the use of glue or disfigurement of nails on the outside surface. Although at first it appears to be complicated it is really quite simple and at the same time a very strong and attractive joint.



DETAILS OF A LUMBER RACK.

The following description with the aid of the accompanying drawings will show in a simple and clear manner how to build and put together the joint.

Figure 1 is a picture of the outside of the joint, or its isometric view, with the two parts named as A and B. Figure 2 is the orthographic projection of part B. Figure 3 is the orthographic of part A. Figure 4 is an isometric or picture of how to put parts A and B together. The lower case letters in each drawing are the corresponding points when starting to put together or when in their final positions. Lines joining these letters are always of equal lengths.

In figure 4, part A is perpendicular to part B, part A standing back from the end of part B by the thickness of part A. Part A is kept vertical and worked down and out toward the end of part B. Part B has a 45 degree sloping surface, starting back twice the thickness of part A on the inside, and sloping to a line on the edge on the outside equal to the thickness of part A from the end of part B. This sloping surface is always a rectangle, otherwise the edge *ab* could not slide down the slope in working part A down and out. When part A is finally placed in its permanent position in part B, there are in part B holes of triangular prism shaped back of part A on the inside of part B. These holes are filled with blocks fitted and glued in place of the same material as the dovetail itself.

This can be used as a blind dovetail also.

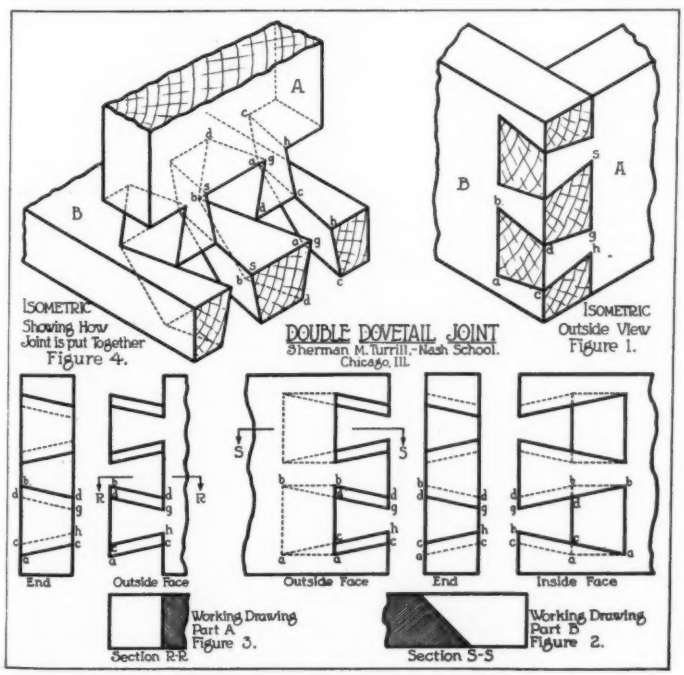
Note: In figure 4, angle b g s on the inside surface of part B is always equal to angle d g s on the end of part B. Also line b d on the outside surface of part B is always parallel to line b g on the inside surface of part B.

THREE CHINESE KITES.

E. M. Wyatt, Dallas, Tex.

These kites were prize winners at a recent kite tournament at Dallas, Texas. They were made and flown by a Chinese youth who learned to make kites in his native land.

The aeroplane kite, Fig. 1, is built of narrow strips of bamboo from ⅛" to ¼" wide. Probably rattan reeds could be used for the framework as well. The wings must be flexible enough to bend backward to the breeze as, like



DETAILS OF A DOVETAIL JOINT.

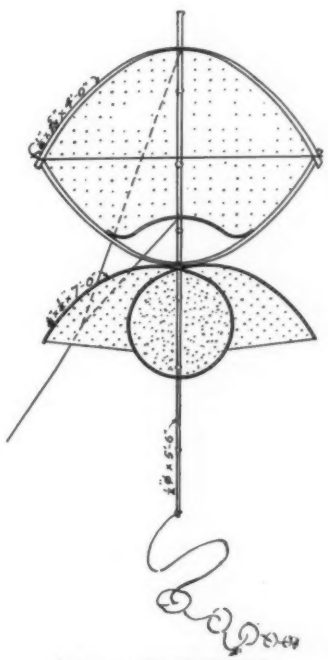


FIG. 2. A CHINESE KITE.

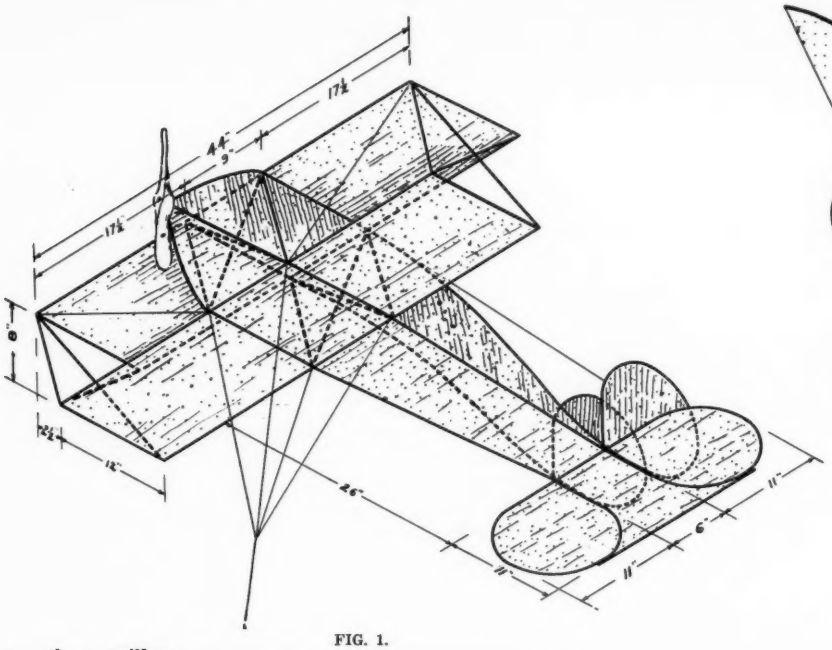


FIG. 1.

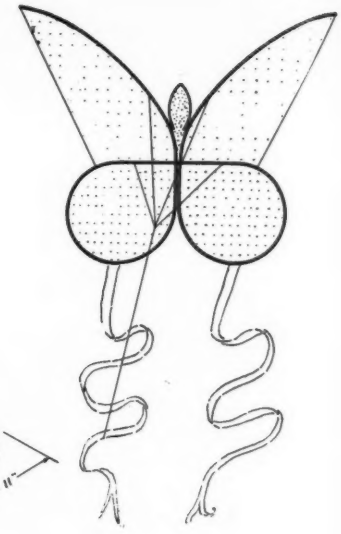


FIG. 3.

most other tailless kites, it must present a convex surface to the wind. It should be papered with light rice paper. The joints should be lashed with light, strong cord and then covered with glue.

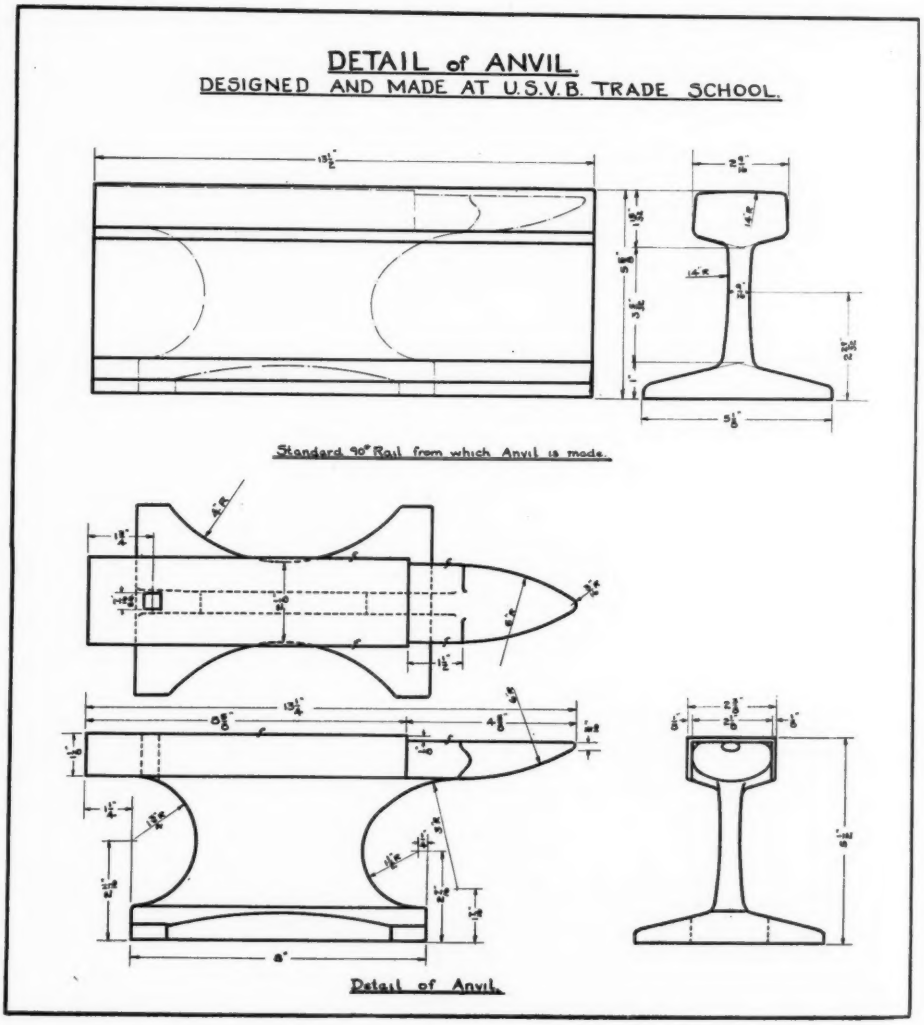
AN ANVIL

Elmore G. Hanson, Chicago, Ill.

The anvil illustrated in the accompanying drawing was made by a student in the mechanical drafting department of the United States Veterans' Bureau Trade School, Chicago. A ninety-pound railroad rail was used and the entire problem was developed in the mechanical drawing room and later worked out in the shop.

After the desired shape was sketched, a detailed drawing was made and used in the machine shop. The problem was not only a good drawing exercise but a splendid machine shop project. It required the use of the planer, shaper, milling machine, drill press and involved considerable hand filing.

The anvil is handy for use in the school shop and is the proper size for the garage and home shop.



The Western Arts Association

Dayton, Ohio, May 6, 7, 8, 9

E. J. Lake.

The thirtieth annual convention of The Western Arts Association passed into history as one of the most successful meetings ever held by this organization.

The happy combination of skilled and active officials; gracious and generous hosts; ideal place of meeting; splendid program and excellent exhibits made the meeting at Dayton notably successful.

President William H. Vogel presided at the general sessions with such gracious dignity and dispatch that only need of a constitutional amendment saved him from continuance in that office.

We learn that Secretary-Treasurer L. R. Abbott has resigned after many years of splendid service. His successor has not been announced by the Council and those who have observed Mr. Abbott's faithful work will despair of finding a substitute.

Frank C. Stanton of Dayton was elected president for the coming year. Mary C. Scovel of Chicago was elected vice-president. M. J. Sherwood was appointed as auditor. The next meeting of the Association will be held at Memphis, Tenn., during the first week of May, 1925.

One distinctive feature of the Dayton meeting was the fact that each general and round-table meeting was carried off promptly and according to program. The attendance at each meeting was near capacity of the splendid, new Roosevelt High School in which they were held. Exhibitions from every important city of the Middle West were placed in the corridors and classrooms of the building. The work was representative of graphical and applied design and showed particular merit in color. Few exhibitions of manual work other than of the Dayton schools were shown but these represented work in metals, woods, ceramics and fabrics of distinctive design and workmanship.

Kindergarten work of Dayton was especially interesting and implied the thorough educational program of the city.

The commercial exhibits were more elaborate and effective than in previous meetings. "The Ship," an organization of the commercial representatives, was much in evidence and helped to establish a fine spirit of cooperation between teachers and tradesmen.

Outstanding speakers of the general program were: William McAndrew, superintendent of schools, Chicago; Paul C. Stetson, superintendent of schools, Dayton; Ralph H. Johonnot, colorist and designer, Pacific Grove, Calif.; Frank B. Slutz, director of Moraine Park school, Dayton; Jens Jensen, landscape architect, Ravinia, Ill.; Earl L. Bedell, department of vocational education, Detroit, Mich.; Mrs. M. F. Johnston, director of art association, Richmond, Ind.; Arthur Dean; Miss Mabel Arbuckle, supervisor of applied arts, Detroit, Mich.; President Arthur E. Morgan, Antioch College; Virginia Currier, Ohio University, Athens; Charles A. Bennett, Peoria, Ill.; Garrit A. Beneker, General Electric Co., Schenectady, New York.

Superintendent McAndrew emphasized the obligations and opportunities of the teacher of Industrial Art with rare force and effect. In his address before the general session under the topic "Some Designs on Drawing Teachers" he pronounced the "fads and frills" as necessary as reading, writing and arithmetic to the school program. "These subjects were not put into the schools by schoolmasters but by citizens and taxpayers," contended Superintendent McAndrew.

Emphasis of Industrial Art as fundamental in education was made by several speakers on the program at Dayton and might be pronounced the key-note of the convention. The following quotations from addresses carry this emphasis:

"In addition to household duties girls must be schooled in design so that they may have a large background of understanding and taste that will give effectiveness to life itself."—Rossiter Howard.

FRANK STANTON,
President-Elect, Western Arts Association.

"The time will come when people will be brought to realize that an art gallery is as necessary to the spiritual development of a community as a gymnasium is to the physical."—Mrs. M. F. Johnson.

"Until we rid our roadsides of billboards and shack tea rooms, America will not have started on her road to artistic development."—Earl L. Bedell.

"America will be remembered for her art when her materialism will have passed the way of Nineveh and Tyre."—Brainerd B. Thresher.

"If America would be successful she should give annual commencement honors to children who show greatest development in initiative and expression. The order of life is changed. Machines no longer serve men, men serve machines."—Frank B. Slutz.

A significant interest was presented in the report of committee on training for teachers at the art round-table by Mary B. Scovel.

In this report appeal was made to colleges for recognition of art toward degree. The situation was represented as acute for art teachers who must have a college degree to teach in accredited high schools when few colleges offering such degrees recognize study and accomplishment that prepares the teacher of art.

A committee was appointed to further the interests of art education in the schools by cooperation with other organizations seeking this purpose.

At the final general meeting Garrit A. Beneker gave a most impressive address on "Art and Our Problems of Today," illustrated by numerous examples of his splendid paintings of the toilers in a great industry.

Joint Convention of the Eastern Art Association, New Jersey Vocational and Arts Association

A. F. Hopper, Director Industrial Arts, Plainfield, N. J.

It sounds commonplace to say that the joint convention of the above associations held at Atlantic City on May 15-17, "was the best ever held," but the sincerity with which this remark was made as congratulations were offered to E. A. Reuther, president of the Eastern Arts Association, Harold F. Fuller, president of the New Jersey Vocational and Arts Association and Miss Clara H. Krauter, chairman of the local committee, together with her able body of assistants to whom much credit is due, left no doubt as to the truthfulness of the sentiment expressed.

As usual, Frank E. Mathewson was here, there, and everywhere and to him must be given credit for the organization of the publicity work which has done so

much to bring the Eastern Arts Association to the front.

One of the features of the convention was the unusually strong program, which was without parallel in the history of either association. This was made possible by the untiring efforts of President E. A. Reuther and A. H. Wentworth, chairman of the program committee, both of whom were highly commended.

Following the usual procedure, the convention opened Thursday evening with a conference of supervisors, and teachers of industrial arts and vocational subjects, under the chairmanship of Wesley A. O'Leary, assistant commissioner of education, Department of Public Instruction, Trenton, New Jersey. The attendance at this conference surpassed all expectations and although one of the largest conference rooms in the hotel had been assigned to this meeting, it was found necessary to adjourn to the general assembly hall, and the conference was hardly under way before it was a case of standing room only. Frank E. Mathewson was the first speaker, taking for his topic "Some Startling Statistics from a Cosmopolitan High School and a Suggested Remedy," which aroused much interest and comment. This talk was followed by a paper prepared by John J. Hatch, director of manual arts, State Normal School, Newark, New Jersey, the topic being" The Significance and Purposes of the Industrial in Modern Education." This proved to be an exceptionally good paper. Charles W. Sylvester, director of industrial education, Baltimore, Md., then read a paper on the "Relationship of Industrial Arts to Vocational Education." This was followed by an informal talk by Arthur F. Hopper, director of industrial education, Plainfield, N. J., whose topic was "Reactions After Studying Certain Schools in Switzerland, France and England." The meeting was brought to a close by a summary of the topics by Robert A. Campbell, state supervisor of industrial education, Trenton, New Jersey.

On Friday morning President Reuther faced an audience that packed the assembly hall to its limit. After a few well-chosen words of greeting from him, from Superintendent Charles B. Boyer, of Atlantic City, and Harold F. Fuller, president of the New Jersey Association, the program proceeded. The outstanding feature of this general session was the stirring address by Dr. Payson Smith, commissioner of education of Massachusetts, who spoke on "Fundamentals of Education." Dr. Smith, in defining fundamentals, made it clear to the audience that the special work they represented must be considered just as fundamental as the old traditional subjects, and in the course of his remarks he stated that he was not so sure but that the subjects that formed the curriculum first should be thrown out first, rather than those that went in last. The address throughout was one of the most inspiring that the association had the pleasure of listening to. Mrs. Caroline T. R. Lewis, director of publicity for the H. R. Mallinson Silk Company, New York, gave an illustrated talk on "Art in the Silk Industry," and in the course of her remarks, she said that industry and art were going hand in hand today, and that art as illustrated in the silk industry has placed American made silk among the best in the world.

Friday afternoon was devoted to sectional conferences arranged by the program committee of the Eastern Arts Association. Excellent papers were read and addresses delivered by various speakers. Among those taking part in this afternoon conference were C. Valentine Kirby, Harrisburg, Pa., Hugo B. Froelich, Newark, N. J., Leon L. Winslow, State Department, New York; Alon Bement, Baltimore, Md., Royal B. Farnum, Boston, Mass., Emeline S. Whitcomb, Washington, D. C., Edward C. Emerson, Boston, Mass., George F. Hatch, Boston, Mass., Wesley A. O'Leary, Trenton, New Jersey, Dr. Franklin J. Keller, New York City, and a number of others.

Another general session was held Friday evening and again President Reuther faced an audience that packed every available inch of space in the hall. The feature of this session was an illustrated address on "The Harding Trip to Alaska" by Dr. J. J. Tigert, commissioner of education of the United States. His talk was listened to by an interested and enthusiastic audience. The latter part of the evening was devoted to an informal dance, the details of which were admirably arranged by the local Atlantic City committee.

Saturday morning was given over to sectional conferences arranged by the New Jersey Vocational and Arts Association. Among those taking part on the program were Dr. David Snedden, Columbia University; J. A. McCarthy, Trenton, New Jersey; Dr. F. B. Struck, Harrisburg, Pa.; Dr. Mary Holmes, New York City, and a number of other specialists.

The joint convention was brought to a close by the "Good Fellowship Luncheon," with Harold F. Fuller, president of the New Jersey Association, acting as toastmaster.

The speakers were Richard F. Bach, associate in industrial arts, Metropolitan Museum of Art, New York City, and Dr. F. W. Maroney, director of physical education, Atlantic City; and Dr. David Snedden, professor of education, Columbia University. Mr. Bach gave an interesting address and among other things stated that while our museums were now used much more than in former years by both students and manufacturers, they were not yet utilized to the extent that they should be. Dr. Maroney gave one of his straight-from-the-shoulder talks on "Keeping Fit," interspersed with good humor that kept the audience in fine spirits. The final address was delivered by Dr. Snedden and was a fitting close to a fine convention. It was one of those clear cut inspirational talks for which Dr. Snedden is so well known on the "Future of Vocational and Industrial Arts Education." His philosophical viewpoint was listened to with keen interest by all present.

The school exhibits while small on account of limited space made up in quality what they lacked in quantity. Never before have exhibits shown off to such advantage, thanks to the generosity of the hotel management in allowing the lobbies of the hotel to be used and the skill of the boys in the Atlantic City vocational school who built booths that were both practical and artistic.

The commercial exhibits also surpassed those of previous years and were more largely attended than ever before. Excellent taste was shown by the various firms displaying their wares.

"The Ship," an organization of the commercial people, was much in evidence, the officers of which looked gay and spruce in their white caps and other decorations.

Much of the success of the convention can be traced to the fine generalship of President E. A. Reuther, who

MEMBERS OF THE EASTERN ARTS ASSOCIATION

gave unstintingly of his time and energy, to President Fuller of the New Jersey Association for his cooperation, to Secretary Mathewson for general management and an unusually fine piece of publicity work and to the Atlantic City local committee, whose exceptionally well-made plans did much to give every individual who attended the convention a pleasant as well as profitable time.

The Eastern Arts Association elected the following officers for next year:

President, Almond H. Wentworth, director of art, Public Schools, New Haven, Conn.

Vice-President, George F. Hatch, assistant director, Department of Manual Arts, Boston, Mass.

The officers of the New Jersey Vocational and Arts Association for next year will be:

President, Martin J. Corcoran, director of Boys' Vocational and Continuation Schools, Elizabeth, N. J.

Vice-President, Philip M. Wagner, Cleveland Junior High School, Newark, N. J.

Secretary, Claria H. Krauter, director of Girls' Vocational School, Atlantic City.

Treasurer, Miss Ruth Culley, Continuation School, Plainfield, N. J.

ADOPT RESOLUTIONS ON DEATH OF PROFESSOR GRIFFITH

The Manual Arts Section of the Educational Conference, at the University of Chicago, upon learning of the passing of Professor Ira S. Griffith on April 30th, adopted resolutions expressing the regret of the members at his passing and the loss of his valuable services to the cause of industrial arts teaching. The resolutions are as follows:

IRA S. GRIFFITH.

Whereas, the Manual Arts Section of the Educational Conference of the University of Chicago has just learned of the sudden death of Professor Ira Samuel Griffith of the University of Wisconsin;

Whereas, his wise leadership through the developmental period in the field of both general and industrial education has been a guide to our thinking and an inspiration to our efforts;

Whereas, his extensive contribution to the literature of our field of work has been of invaluable assistance to students and teachers in that field;

Whereas, his high ideals, his wholesome personality, and his progressive spirit have endeared him to all who knew him;

Be it resolved, that this organization express its sorrow at his passing and express its sympathy to his bereaved family;

Be it further resolved, that a copy of this resolution be sent to the family and to the educational press.

MR. FRYKLAND SUCCEEDS MR. BURTON

The Department of Industrial Education of the State Teachers College at Kearney, Nebraska, has lost Professor L. E. Burton who has been Director during the past seven years. He becomes a member of a prominent firm of contractors at Muncie, Indiana. Professor Burton has built up a successful department and his leaving Kearney leaves a gap that will be difficult to fill. He is a graduate of

V. C. FRYCKLAND,

Muncie, Indiana, Normal School and has a B. S. degree from the State College at Manhattan, Kansas. His many friends in the industrial education field wish for him the same highly successful career in building that he has attained as an educator.

Professor Burton's successor is Verne C. Frykland, who has been an instructor in the department since 1922. He is a graduate of Stout Institute and has his A. B. degree from Colorado Teachers' College at Greeley. He has held teaching positions at Detroit, Denver, Houston, Texas, and at Colorado Teachers' College.

Professor Frykland is also a practical draftsman and builder, and is a World War veteran. His experience in drafting has been varied. It includes architectural, mechanical and engineering drawing. His most recent work was a large official map of the city of Kearney done in conjunction with City Engineer, Harry Mole.

IN CONVENTION AT ATLANTIC CITY, N. J.

NOW ARE THERE ANY QUESTIONS ?

Dark Brown Stain

Q. 466. I desire to finish gum wood and birch a dark blackish-brown. I have used brown mahogany penetrating stain but the color is too light. Could you inform me how to secure this color on these woods? The projects will be given a varnish finish.—F. W.

A. "In order to secure a dark blackish-brown on gum and birch it will be necessary to add spirit soluble black and spirit soluble red anilines to the penetrating stain which you first used. Your use of this term leads me to believe that you are using a spirit soluble stain. It is quite probable that you can get a shade desired by using definite proportions of the black and red stains carried by the dealer on his shelves.

"If this method does not give the desired results I will be able to furnish you with necessary water stains which are far more permanent and transparent than others."—Ralph G. Waring.

Finishing Black Walnut

Q. 467. I am writing you to ask the best method of staining genuine black walnut. Should it be stained in oil or water stain? How would furniture finishers do this, or would they use an acid stain?—G. H.

A. "By far the best results in the staining of walnut are secured through the use of a water or so-called acid stain. Oil and spirit materials do not give the clear depth of tone and freedom from muddiness which characterizes the beauty of the water stain. The piece to be stained should be first sponged in clean, warm water to raise the grain, dried thoroughly and then sanded smooth with worn out 00 paper or split 6-0 paper. A coat of hot water stain should then be brushed on and allowed to dry over night. Without sanding apply a coat of orange shellac made water thin with alcohol. Stock shellac as sold over the counter is cut from four to five pounds of gum per gallon of alcohol. Material used on the walnut, therefore should not be used in excess of one pound per gallon, acting as a sizing material only. When the shellac coat has thoroughly dried three to five hours in a warm room, sand glass smooth with a split 6-0 paper, giving special attention to all end grain. Afterward the work should be given a coat of silex filler, tinted a dark chocolate brown or black brown, using Van Dyke brown, burnt umber, burnt sienna and possibly a trace of drop black. The filler should be carefully rubbed in with a leather or cloth pad, then carefully wiped off with a clean cloth and any excess material completely removed from all corners, edgings, and carvings. Let dry 48 hours in a warm room, dust off and brush on carefully a well worked out coat of high grade varnish. Let dry three to five days in a warm room, sand lightly with a split 6-0 paper, dust off and revarnish. If a thin finish is desired a second coat should be heavy in body, having been laid on with a flowing stroke to apply all the material possible and yet avoid sags. Let dry one week and rub out with felt pad, pumice stone and water or crude oil. Clean up with a good polish."—Ralph G. Waring.

Refinishing Automobiles

Q. 472. Will you please give me or tell me where I can get complete specifications for refinishing an automobile? We want the color when finished, to be maroon. —C. E. T.

A. Refer to "Refinishing Automobiles"—Clyde A. Bowman, Page 310, August, 1920, Industrial Arts Magazine; "Automobile Refinishing in the Home Garage"—Ralph G. Waring, Page 146, April, 1920, Industrial Arts Magazine.

Finish for Small Table and Cabinet

Q. 477. I desire to finish a small table and music cabinet of mahogany. I have given it a coat of penetrating stain and desire to finish it properly.—F. W.

In regard to the finish on a small table and music cabinet it has been my experience that very poor results usually attend the use of so-called penetrating stains. This is due to the fact that the so-called oil soluble anilines are not soluble in the oil in the sense that salt dissolves in water but are merely liquids containing color in a very finely divided mechanical form. For this reason the so-called penetration is a great misnomer. With some classes of penetrating stain trouble with the finish disintegrating frequently occurs. For instance, I have known this material to sweat or bleed through four coats of varnish. Knowing the troubles which attend the use of this group of materials, I have abandoned their use in both trade practice and school shop. It is far better to use a water soluble stain which can be made from materials affording a minimum raising of the grain, the greatest penetration of all stain materials and the ability to be mordanted or to be chemically fixed to prevent the fading of the stain. In regard to the shellac, it is quite possible that you used this material too heavy. Commercial material as bought by the gallon contains from four to five pounds of gum per gallon. This should be diluted with denatured alcohol so that when ready for use the cut will not exceed one and a half pounds. This is sufficient to act as a sizing material driving the stain through any grain which may have raised through the use of the water stain. When dry the shellac coat should be sanded glass smooth with a 6-0 paper and immediately followed by the filler. In this manner the shellac prevents the absorption of oil from the filler and subsequent discoloration. Shellac should not be used after filler since this will prevent the proper union between the filler and varnish coats. The full depth of tone does not develop in the filler coat until covered with the varnish. To use a coat of shellac, therefore, on top of the filler usually results in a very unpleasant gray cast beneath the varnish.—Ralph G. Waring.

NEW BOOKS.

Farm Engineering

By Byron Burnett Robb and Frederick Gardner Behrends. Cloth, 454 pages. Illustrated. Price, $2.50 net. Published by John Wiley & Sons, Inc., Brooklyn, New York.

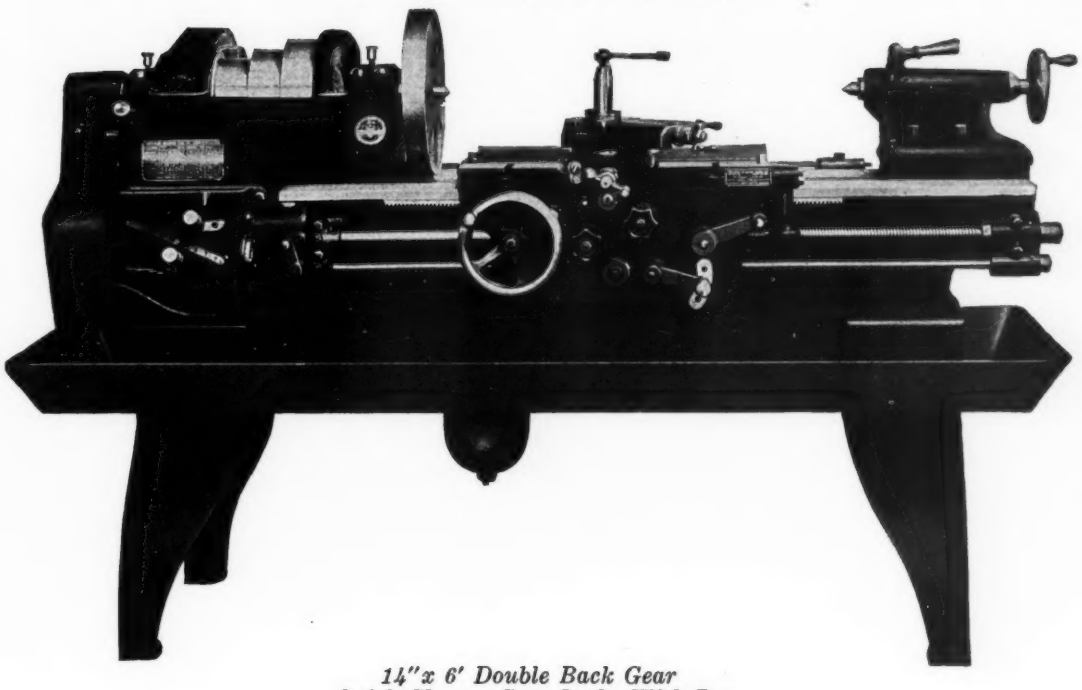
This book takes up farm mechanics and provides definite instructions for 185 necessary mechanical jobs which farmers may well perform. The book is the first of a series to be edited by Mr. A. K. Getman and Prof. C. E. Ladd, and the omission of all reference to certain common types of farm mechanics work is probably to be explained in the fact that the later books will take up woodwork, etc.

The book is divided into ten chapters, taking up respectively harness repair; knots and rope work; belt, pulleys and shafting; soldering; printing; leveling; farm drainage; concrete work; farm water systems, sewage disposal. The entire book is based upon job analysis, and is definite, brief, and amply complete for any mature student or farmer. The earlier chapters are particularly strong and reflect long experience in teaching the subject. The chapter on belts and pulleys includes as one problem a particularly fine illustrated outline of a method of installing the machinery and shafting in a small farm shop. The chapter on concrete is surprisingly complete and contains ample detail drawings, directions, and general information for undertaking any reasonable farm job. The chapters on a water system and sewage disposal involve several types of work for which a skilled experienced plumber seems necessary and some expert sanitary advice seems essential. The recommendations and devices shown in these chapters are excellent as far as they go but there are many situations and problems in the laying out of sanitary and water systems in a home which are beyond the amateur home mechanic. The book has complete lists of references and is splendidly illustrated.

Essentials of Printing

Frank S. Henry, Cloth. 8vo; VII and 187 pages. Price $1.25. John Wiley & Sons, New York.

The title of this book clearly indicates its content and purpose. It outlines the bare essentials of printing for the novice and treats the entire subject in the simplest language. No special teaching method is employed and no jobs are suggested so that the book may be used as a reference or guide with any set of lessons or problems. The book is fully illustrated.



14"x 6' Double Back Gear
Quick Change Gear Lathe With Pan

More Monarch Lathes are being used in manufacturing plants throughout the country than any other make. More Monarch Lathes are being installed in Manual Training Departments of schools than any other make of lathe. The student, upon completion of his school work, will find himself coming in contact with Monarch Lathes in most shops.

Monarch Lathes are built in sizes ranging from 9 inch to 30 inch swing, and bed lengths from 2½′ to 30′.

Our Engineering Department will gladly submit plans and layouts for machine shop installations and we are in position to give Vocational Instructors valuable information and plans, for which no charge is made.

There is a Monarch Dealer near you, who will gladly show you the merits of Monarch Lathes.

Let us send you Special Vocational Bulletin.

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Largest builders of high grade engine lathes and specialist in lathes for Vocational Training.

"What's Eddy looking so black about?"

"Oh, he's sore because I won't lend him my Starrett Combination Square — the one tool I can't get along without."
"Well, he'll get over it. One of these days he'll buy one and see for himself why it's such a hard tool to borrow."

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Start with Starrett and start RIGHT. The Tools you get in a Starrett Apprentice Set are good for a LIFE-TIME'S accurate service. For sale at good hardware stores everywhere.

Write for Catalog No. 23 "CE" and the Supplement describing the new Starrett Tools.

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NEWS AND NOTES FROM THE FIELD

Explain Apprenticeship. Under a plan agreed upon by the building trades employers, a representative in each community will visit the public schools this year to explain to the graduating classes the advantages of apprenticeship in the building trades. Such a step on the part of the contractors is an indication of the increasing willingness of employers to cooperate with the schools, a desire to strengthen the mutual serviceability between the schools, and to further the economic interests of the community. Vocational teachers and supervisors in each community are to act as liason officers and contact is to be established between school principals and officers of the local building trades employers' association in order that the proper arrangements for the visits may be made.

Hawaii Enters Vocational System. The benefits of the Vocational Education Law and the Civilian Rehabilitation Act have been extended to the Territory of Hawaii under the provisions of the Jarrett amendment, approved by President Coolidge on March 10th. The amendment gives full equality with the 48 states in the benefits of both acts. It provides for an annual total of $30,000 for vocational education, and $5,000 for civilian rehabilitation. These funds are to be matched, dollar for dollar, by territorial appropriations.

Continue Federal Rehabilitation Service. Continuance of the policy of Federal aid to the states for the vocational rehabilitation of disabled civilians is forecasted by the passage in the House of Representatives on May 10th of the Dallinger amendment. The amendment authorizes an appropriation of $1,000,000 for a period of four years, following the close of the present fiscal year, the amount to be available to the states for promoting the program of civilian rehabilitation. Under the present act, no federal money would be available to the states after the current year. The effect of the amendment is to extend the period of Federal participation in the work for four years longer. Any interruption to a program which has demonstated its practicability, and which the people of the country demand to be continued, would be nothing short of a calamity to the 18,000 disabled persons in process of rehabilitation, to say nothing of the thousands who will need the service in the future.

It is estimated that the number of disabled persons registered for rehabilitation during the past three and one-half years has increased from 4,972 in 1921 to 15,515 in 1923, and it is believed that the year 1924 will see this number raised to 21,000 persons. The actual number of persons rehabilitated has increased from 457 in 1921 to 4,530 in 1923, and the year 1924 should see the number well above 7,000.

Industrial Motion Picture Film. "The Story of Gasoline" is the title of a three-reel industrial motion picture film released for public exhibition by the Pennsylvania Department of the Interior, through the Bureau of Mines. The film is designed to make plain the complex processes involved in the production and distribution of this essential product. A series of pictures shows the obtaining of the crude petroleum from wells and its storage in huge tank farms. Views of modern petroleum refining plants in operation are given. A series of laboratory scenes makes clear the distillation tests by which the gasoline is made to conform to governmental specifications. Another series of pictures illustrates the storage of gasoline at refineries and its shipment, the story of transportation finally culminating in the filling of the automobile tank at the public garage.

The Story of Gasoline and other industrial films may be obtained by writing the Bureau of Mines, Pittsburgh, Pa.

Registry for Printing Teachers. The United Typothetae of America has announced the establishment of a registry for applicants for positions as printing teachers. This service is maintained by the printing industry as a whole, through its international organization, with the sole purpose of securing capable printing instructors and of promoting the teaching of printing in the schools. Through the teachers' registry, school officials are enabled to get in touch with competent teachers of printing. Applications are frequently received from men of unusual equipment, both in trade training and teaching experience, as well as personal qualifications.

It should be noted that the registry makes no charge for the service rendered. It is conducted entirely in the

(Continued on Page XXII)

PRINTING

The Modern Educational Tool

PRINTING IS AN INDUSTRIAL ART THAT COMBINES CULTURAL AND MANUAL EDUCATIONAL ADVANTAGES

Language–The raw material of Printing is language–any language. Through the art of Printing the pupil is brought into close contact with the best literature and a desire is aroused for greater knowledge of the mechanics of language.

Spelling–Greater appreciation of accuracy is aroused by means of printing. The sight-sense pupils are most readily taught spelling through type composition.

Grammar–Abstract methods of teaching this important subject are uninteresting. Motivate grammar by means of Printing.

Art–The principles of design are always taught in connection with Printing–"The Art Preservative of all Arts."

Punctuation–"Cold Type" demands a proper use of punctuation marks. Commas, periods, colons, semicolons, quotations, exclamation and question marks mean something to the pupil who is taking printing instruction.

Mathematics–The mathematical problems in Printing are interesting and can be used in any grade from the sixth to the high school.

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Science–The theory of light, heat and electricity should always be correlated with Printing. The laboratory problems should be the making of paper, ink and printers' rollers.

Superintendents of schools and principals are urged to request further information about Printing–the Modern Educational Tool. Write to

F. K. PHILLIPS, *Manager of Education Department*

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Selling Houses in most of the Principal Cities. Let Us Tell You of the Nearest One

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What are its possibilities in the hands of YOUR PUPILS?

Samples sent gratis to Teachers on request.

JOSEPH DIXON CRUCIBLE COMPANY

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(Continued from Page XX)

interest of the printing industry as an incidental feature of the educational program.

Summer Vocational Conferences at Kansas State College. The summer conferences in vocational education for teachers and supervisors in Kansas schools will be held in two divisions, the first to be held June 6-7 at the Kansas State Agricultural College, Manhattan, and the second June 9-12, at the Kansas State Teachers' College, Pittsburg. The conferences are being held with the co-operation of the State Board for Vocational Education and will be in charge of Mr. C. M. Miller, director, Topeka, Kans.

Model Yacht Regatta. Manual training activities in schools include many useful and socializing features. Among these are kite construction, kite tournaments, model boat and yacht construction, and regattas or yacht races.

The model yacht construction and races held last year at Los Angeles, Calif., were inspired by the Los Angeles Evening Herald and were repeated in June this year. At this time more opportunities for participating in the contests were afforded the children of the elementary schools.

These contests or marine tournaments are open to juvenile yacht builders and yacht sailors of every grade above the fourth, and diplomas and other prizes will be awarded the best architect, the best constructor and the best sailor of miniature boats and yachts. The contest is being sponsored by the Southern California Yacht Clubs and is conducted under the direction of Mr. C. A. Kunou, supervisor of elementary manual training in the Los Angeles schools.

Build Agricultural Building. A building for the use of the agricultural department in the high school at Southington, Conn., was recently built by the boys of the agricultural and manual training departments. The work was planned and carried out under the supervision of the instructors in these departments.

Labor Unions to Aid School Work. The American Federation of Labor has taken steps to create a permanent committee on education and to interest itself in the schools and universities. The movement which is supported by Mr. Matthew Woll, vice-president of the federation, has a number of aims among which the following relate to industrial education:

That the wage earners of each city be adequately represented on the municipal school board.

That there be labor representation on the boards of directors of all state universities and other institutions of higher learning that are part of the public school systems.

That industrial education include sciences underlying industries, their historic, social and economic implications, as well as the technical side—specific vocations.

That in each locality there be developed opportunities for continuation schools and night schools.

Manual Arts Products Sold. The Manual Arts Department of Belding, Mich., held a sale of toys, baskets and trays made by the pupils of the department, during the Christmas holiday season. One of the local merchants during the week preceding Christmas, loaned the department one of his display windows for exhibiting the collection of products made for the sale. The sale netted the department a little over $60. During the period of the sale, the boys took charge evenings and Saturdays.

The department is now engaged in recaning chairs for citizens of the town. Another project is the construction of radio cabinets. The proceeds of the work will be used to swell the fund being collected for a new lathe.

The department reports the occupation of a new finishing room. The room was made by partitioning off some unused space at the end of the hall. The room has proved satisfactory in use as it is light, well heated and sufficiently large for the purpose intended.

New Film on Portland Cement. The Department of the Interior has just released a new industrial motion picture film entitled "The Story of Portland Cement." This film has been prepared in cooperation with the Portland Cement Association in commemoration of the 100th anniversary of the invention of Portland cement in 1824, and may be obtained by applying to the Department of the Interior, Bureau of Mines, Pittsburgh, Pennsylvania.

(Continued on Page XXIV)

Far in the Lead

are our "CRAYONEX" wax crayons.

They have a better breaking strength than competitive makes: their colors are brighter, and better mixed.

With these crayons, students can secure the required color effects quickly.

When one or more of these colors are laid over one another, they blend splendidly.

We made the first school crayons in 1835. Our "CRAYONEX" wax drawing crayons received the grand prize award at The Rio De Janeiro World's Fair Exposition 1922 - 23. Can more be said?

Insist on the best—"CRAYONEX".

Write for our new booklet on the subject.

The AMERICAN CRAYON COMPANY

ESTABLISHED · 1835

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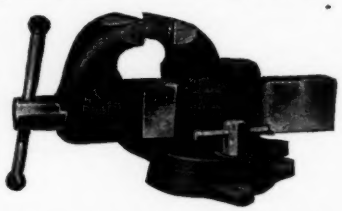
"Old Faithful"

COLUMBIAN

Vise Equipment meets every need

You can get Columbian Vises for every department of your school.



Columbian Malleable Iron Machinists' Vises will give real service. Made in all standard types and sizes.

Columbian Manual Training Vises are widely used in all wood working industries. Choose the style and size to meet your needs.

Columbian Forged Steel Leg Vises have been a standard in iron-working, structural steel and blacksmith shops for years. They are built to withstand the most severe usage.

Instructors:

A copy of our complete catalog will help you in planning your future equipment. Send for one.

The Columbian Hardware Co.

World's largest makers of vises and anvils

Cleveland

(Continued from Page XXII)

Los Angeles Part-Time School. The Part-Time High School of Los Angeles, Calif., opened on September first of the present school year in a newly completed building adapted to its growing needs. The school is located in the business district on land valued at $120,000. The building is of the three-story, Class A type of construction and cost $500,000.

The building makes possible considerable expansion in the variety of work offered to part-time students. It is estimated that the building can take care of a weekly enrollment of 4,260 pupils and fifty teachers and fully 500 students in addition. The shop has classrooms in conjunction with it and is of composite type, providing opportunity for multiple try-out classes. Mechanical drawing and shop work, with related science, have been expanded and developed in accordance with the new facilities offered and the demand for the work.

Advisory Room. A special service to part-time pupils in Los Angeles, California, is the advisory room in charge of Mrs. Elsa Smith and Mr. L. J. Beaufait. An average of thirty pupils pass through the room each day.

New Part-Time Schools in California. The rapid growth of the smaller communities in California has made necessary the establishment of a number of new part-time schools this year. Jackson, Manteca, Norwalk, Santa Maria and Tomales have reported classes, while Concord and Pittsburg have made plans for similar classes.

Coordinator in Sacramento. Miss Elizabeth Livermore has become coordinator in the Sacramento part-time high school, succeeding Miss Flaa. Miss Livermore is a graduate of the Prince School of Store Service and continues the fine work for which the Sacramento School has been noted.

Trade School Gift. The citizens of Middletown, Conn., on April 29th voted on the question of entering into a contract with the Connecticut state board, and to agree to furnish a suitable building and to provide heat, light and power and one-half the janitor and watchman service for a trade school to be established in the city. Mrs. C. G. R. Vinal had previously offered the site and building for the purpose of a trade school on condition that the city meet the expense of maintenance and operation. The expense of the school district will be from $4,000 to $4,500 a year, that of the state education department from $25,000 to $30,000, and some aid will come from the Federal government.

Aid in Choosing Careers. Stressing the need for helping New York City boys and girls in finding themselves and their places by a complete system of vocational guidance organized and operated by the public schools, Miss Alice Pollitzer, formerly director of the vocational service for juniors in New York City, in a recent radio talk, urged parents to join in the efforts made to get this service for children. At the present time the vocational service organization is privately endowed and is able to reach only a small fraction of the city's children.

At present, twelve schools in Manhattan, most of them on the lower east side, have established this vocational service. In each of them a vocational counsellor works with the children, noting signs of ability and power, and showing how these can function in the choice of a career, and also indicating the intermediate steps in education and training which are necessary to success in the chosen career.

According to Miss Pollitzer, the counsellors are college graduates with special knowledge of the problem, who are familiar with the educational, industrial and social conditions of the city and who have had experience in the classroom and the working world.

In carrying out the details of the plan, the counsellor seeks to gain an idea of the child's ambitions and his plans for attaining them. A study is made of the child's school and health records, and to these are added the results of a general intelligence test made by a trained psychologist. The information is all combined as a basis in helping the child to choose his further education and occupation.

Manual Arts Exhibit. The annual exhibit of the manual arts department at Winfield, Kans., was held during the second week of May, in the high school building. The exhibit was open to the public both afternoon and evening and was visited by 4,550 adults. Programs and demonstrations of classwork were given each evening with more than a thousand pupils taking part. In addi-

(Continued on Page XXVII)

STANLEY

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"Everlasting" Chisels

Head, Shank and **Blade** are forged from one piece of tool steel. Insures great strength and durability. Provides maximum of efficiency, as a blow on the head is transmitted directly to cutting edge.

Leather washer between handle and steel head serves as cushion, thereby relieving handle from shock. Handle of selected hickory, fitting snugly into ferrule.

STANLEY
NEW BRITAIN, CONN., U.S.A.
THE STANLEY WORKS — THE STANLEY RULE & LEVEL PLANT

(Continued from Page XXIV)

tion to these, there were exhibits of special features of classroom work from the elementary school and from each academic department. Among the features at the exhibit were a furniture display, an art exhibit, a May Fete given by the girls' gymnasium classes, a stock show of animals raised by the boys in vocational agriculture classes, programs written by the students in journalism and printed in the school print shop by boys with only a short period of training.

The exhibit was first inaugurated in the spring of 1913, two years later, the art department was added, and in 1922-23 the exhibit was expanded to include not only displays of handwork but academic subjects as well. The annual exhibit is a demonstration of the actual classwork of the students and portrays in an interesting manner the life of the schools.

Polychrome and Leather Work Shown. Construction work and the industrial arts were exhibited in May by the junior high and grade schools of Winfield, Kans. Most of the specimen work was in the form of samples of toy making and rug-weaving.

The high school industrial arts club had an interesting display of polychrome candle-holders, wax work, lamp shades, leather tooling, enameled articles, candles, vases and clay work.

Prize Poster Contest. The first prize of $25 for the best poster for the Eastern Arts Association Convention was won by Miss Esther Jacobi of the Hutchinson Central High School, Buffalo, N. Y.; the second prize of $15 went to Miss Irene Berger, of the Wm. Penn High School, Philadelphia, and the third prize of $10 was given to Miss Eva Lonholm, also of the Wm. Penn High School. The winning design shows an artist with his palette and brushes. Above his head is the name "Eastern Arts Association Convention" and the date. The design is worked out in three colors, the figure in black on a green background, the palette, heads and face in yellow and the lettering in black. A liberal border of yellow extends around the entire design.

The posters were judged for their advertising value, design, artistic qualities and technique and the judges were well known art and advertising experts. The winning posters were exhibited at the convention held during the second week in May.

Industrial Work Elective. Pupils in all grades from the second to the eighth, on the Island of Guam, are offered a choice of industrial work, including sewing, lace making, carpentry, mat weaving, rug weaving, basket weaving, and cloth weaving. Industrial work is compulsory for one hour a day in these grades. A minimum sewing course must be completed by boys before they are permitted to enter the high school. In the case of girls, a minimum sewing and cooking course must be completed before a certificate is given. Both boys and girls must pass successfully an athletic test before they may receive diplomas.

Evening Classes for Carpenters. The board of education of Denver, Colo., in cooperation with the carpenter's local union No. 55, recently established two classes for carpenter apprentices. The classes are composed of 25 students each and sessions are held two evenings each week. The work includes the use of the steel square, laying out work, and planning and figuring of details of construction. Mr. G. H. Wilson is in charge of the classes.

Paper Hanging Class. An evening class in paper hanging has been established in connection with the opportunity school at Denver, Colo., in response to requests of the employers' association and the painters' union No. 79. The class meets five evenings each week and the work is carried on in a small dwelling house where conditions are favorable for teaching.

Amendment of Smith-Hughes Act. The Home Economics amendment to the Smith-Hughes Act has been reintroduced in Congress by Senator Fess and is now known as Senate Bill 1408. The proposed amendment will give more federal funds for the establishment of home-making classes in public schools. It apportions money for home economics education on the basis of the total population of a state and eliminates the restriction in the original law which apportioned money on the basis of a state's urban population.

An important provision of the law is the stipulation that part of the funds must go toward the establishment

GENUINE
TRADE MARK
"Jorgensen" STEEL
REG U S PAT OFF NUTS
STEEL
SPINDLES

Look for the name.
The first successful steel spindle handscrew.

HARD
MAPLE
JAWS

10 sizes Adjustable
10 sizes Non-Adjustable

Write for catalog and prices or get them from your dealer.

ADJUSTABLE CLAMP CO.
216 N. Jefferson St., Chicago

Educator who knows tools wanted by manufacturer

The man who can fill this position may now be a teacher of manual training or local or state director of vocational education.

He is between 30 and 45 and wants to broaden his field of work along commercial lines.

He knows carpenters' tools and their use in schools.

A great manufacturer wants him to do educational work with schools and dealers.

He will have an important position, with good salary at start, and unlimited opportunity.

This advertisement is inserted by us for a client. Write fully to Donovan-Armstrong, National Advertising, 1211 Chestnut St., Philadelphia.

of part-time and evening classes for workers over 14 years of age, who have entered upon employment.

Manual Arts Conference. A manual arts session was held in connecteion with the 36th Annual Conference of Secondary Schools, held May 8-9, at the University of Chicago, Chicago, Ill. The program was in charge of Mr. L. Day Perry, of Chicago, who was assisted by Mr. Robert Woellner of the University of Chicago, Mr. Heber Taylor of Oak Park, and Mr. L. A. Emerson of the Joliet Township High School. The subjects and speakers were as follows:

"Manual Arts as an Integral Part of the General Program," Mr. E. C. Phillips, University of Illinois, Champaign; "Manual Arts as an Integral Part of the Senior High School Program," Mr. Allen L. Shank, Mishawaka, Ind.; "Intensive Vocational Courses in the Senior High School," Mr. L. A. Emerson, Joliet Township High School, Joliet, Ill. Mr. A. G. Bauersfeld, of Chicago, led in the discussion which followed.

TRADE PRODUCTS

New Oilstone Tool Grinder. The Mummert-Dixon Co., of Hanover, Pa., has announced the marketing of its new No. 475 Plurality Oilstone Tool Grinder, which is considered the most convenient, serviceable and efficient tool sharpening machine ever put out by the firm. The tool grinder has been carefully designed, combining in a compact arrangement all the essential features of the older models which have given satisfaction for many years.

The machine meets the demands of all kinds of woodworking shops where a small grinder is especially desirable for grinding and sharpening all kinds of tools such as bits, chisels, gouges and the various bench tools.

The machine is ball-bearing throughout, which makes the drive almost frictionless and gives the greatest power efficiency. A leather stropping wheel is provided for removing wire edges and for putting the finishing touches on tools. A grinding cone mounted in front of the stropping wheel, on the end of the ball-bearing motor shaft is used for grinding gouges and irregular-shaped tools. The emery wheel on the outer end of the ball-bearing shaft is used for general dry grinding. Other features are provisions for a saw gumming attachment and a sliding tool holder for holding chisels, plane bits and other small tools. The machine is fully guarded with numerous safety features and is entirely compact and accessible, obviating the necessity of walking around to get at the various wheels.

Information concerning the machine may be obtained by writing the Mummert-Dixon Co., at Hanover, Pa.

Two-Speed Arrangement for Band Saw. The Porter-Cable Machine Co., at Syracuse, N. Y., has announced a new two-speed arrangement for its No. 20 motor-driven band saw which is expected to double the usefulness of the saw. The device makes possible the conversion of the band saw into a dual-type machine, for both wood and light-metal cutting. For wood, the regular speed of about 3,000

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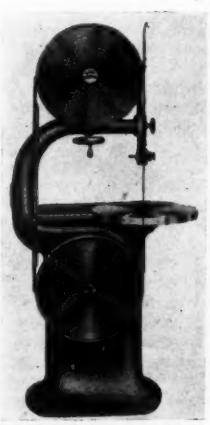
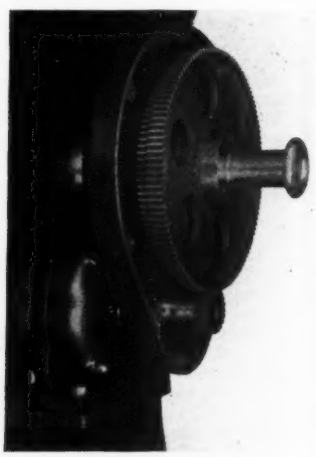


SYRACUSE 20" MOTOR DRIVEN BAND SAW, TYPE B-S.



TWO SPEED ARRANGEMENT OF PORTER-CABLE BAND SAW.

(Continued from Page XXVIII)

feet per minute is possible. For metals, it is only necessary to pull out the knob on the gear case, which shifts the gears and reduces the speed of the saw by one-half. The operation is positive in action and without wear upon the gears.

The motor which is housed in the base, is totally enclosed and is ball-bearing throughout. This eliminates the disadvantage of dust and grit, obviates the danger of belts and open gears, and preserves the neat appearance of the machine.

The present device adds to the usefulness of the band saw for pattern-shop work and is especially suitable for aluminum and brass cutting, sawing hard rubber and fibre in scroll designs, and for all intricate cutting requiring accurate work.

Information concerning the two-speed device may be obtained by writing to the Porter-Cable Company at Syracuse, N. Y.

Reversible Single Spindle Shaper. The Crescent Machine Company of Leetonia, O., has announced the marketing of its new ball-bearing, reversible single spindle shaper which should appeal to the shop mechanic skilled in operating a single spindle shaper. The absence of belts, the elimination of the long shifting rod and detached countershaft are some of its advantages. In addition to these, minimum floor space and self-contained construction make the tool especially desirable.

The machine is adapted for use on higher class irregular moulding operations where accuracy and durability are demanded. It is also useful for continuous use in quantity production where uniform output and low cost of production are important considerations.

The design and form of construction of the base makes a strong, rigid base casting and insures a steady-running machine at all times. The spindle is mounted on two self-aligning ball-bearings, and is given additional support at the lower end, by passing through the vertical shaft that carries the cone pulley.

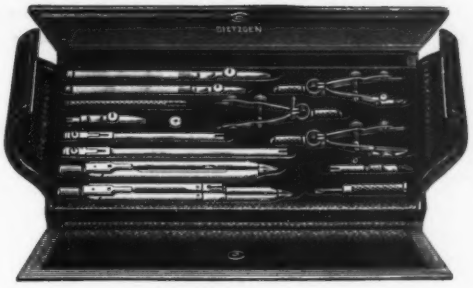
Two sliding keys inside the vertical shaft engage with keyways in the spindle and insure equal distribution of the driving strain. The table is of cast iron, heavily ribbed, planed true, and securely bolted to the base. The driving frictions are keyed to the horizontal shaft and have a simple and convenient adjustment for taking up wear. The eccentric lever is self-locking in any position; by swinging it from right to left the driving frictions are shifted so as to start, stop or reverse the spindle at the will of the operator. The main drive pulley is attached to the main drive shaft, which is supported by self-aligning ball-bearings and connects to the horizontal drive shaft by means of a sliding coupling.

The ball-bearings on the horizontal shaft and on the main drive shaft are lubricated by means of sight feed lubricators, which are so regulated that one drop of oil passes through each three minutes. Each driving friction has a simple, independent adjustment for equalizing the contact and for taking up possible wear. It is usually necessary to adjust only the cone showing the most wear.

The simplicity with which the machine may be driven by a motor is another feature that should appeal to users. A motor base may be substituted by removing the drive shaft and its supporting bracket, on which may be placed any standard motor capable of running 1800 R. P. M.

TRADE PUBLICATIONS.

New Starrett Catalog. The L. S. Starrett Company, Precision Tool and Hacksaw Manufacturers, of Athol, Mass., are distributing copies of their new catalog No. 23. This catalog, the best ever published by the Starrett Company, includes all the latest Starrett tools which have been added to the line since the publication of the last catalog. Many of these are shown here for the first time as they have just been put in production. Among them might be mentioned the new angle gauge, hold downs, pocket micrometer case, dial bench gauge, rolling mill gauge and others. In all, over 2,200 precision tools, hacksaws and steel tapes are illustrated and described, together with uses, in this comprehensive catalog and copies can be procured at any hardware store carrying Starrett tools or by writing to The L. S. Starrett Company direct.



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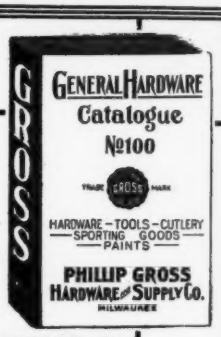

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